APPLICATIONS OF THE PRECEDE MODEL TO THE EVALUATION OF CERVICAL CANCER SCREENING BEHAVIOR AMONG COLLEGE WOMEN

By

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Abstract of Dissertation Presented to the Graduate School
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APPLICATIONS OF THE PRECEDE MODEL TO THE EVALUATION OF CERVICAL CANCER SCREENING BEHAVIOR AMONG UNIVERSITY OF FLORIDA COLLEGE WOMEN

By

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The purpose of this study was to utilize a diagnostic health promotion framework, the PRECEDE Model, to assess variables associated with women's compliance with Pap test guidelines. Using the educational and organizational diagnosis from the framework of the PRECEDE model, 15 constructs were identified as the predisposing, reinforcing and enabling factors that contribute most significantly to the target behavior of interest, specifically a college woman's obtaining an annual Pap test. Demographic variables age and ethnicity were also included in the model.

Participants in this study were 400 randomly selected women from among all full-time enrolled women at the University of Florida during the Fall 2002 term. The UF population during this period consisted of 24,000 women, including undergraduate, graduate and professional students. The instrument for data collection was developed utilizing three existing questionnaires with varying degrees of reliability and validity, and was supplemented by items developed by the researcher.

Data were collected using Dillman's Total Design Method, which included a pre-notification email followed by an email with the consent link. Upon consent, the link automatically took participants to the questionnaire. Three additional requests for participation were emailed to the sample (n = 400). The final response rate was 40%, with 159 respondents. Data were read electronically as HTML tables, copied and pasted into Excel, and finally transferred into SPSS. Descriptive and inferential statistics were used to analyze the data. Multiple logistic regression analysis was used to address each of the first three research questions.

Three variables were found to be significant at the .05 level. These were using a prescription contraception, having or preferring a female provider, and a positive attitude about Pap testing. Neither the age nor race of participants was found to be significant.

As a result of the findings, some proposed improvements for women's healthcare emerged. First, reproductive health professionals should consider the implication of reducing the need for Pap testing among certain populations. Additionally, similar to other research in this area, this study supports the call for consumer and provider education. Finally, these findings suggest the need for tailoring obstetrics and gynecology practices to the consumer.

CHAPTER 1
INTRODUCTION

Every year in the United States, between 15 and 19 million people become infected with a sexually transmitted disease (Centers for Disease Control and Prevention, 2003; Weinstock, Berman & Cates, 2004). Of the millions of Americans infected, approximately 6 million will have contracted human papillomavirus (HPV), the pathogen primarily responsible for cervical cancer (National Cancer Institute, 2002).

HPV is a viral pathogen that is transmitted through sexual behaviors. Researchers estimate that there are approximately 70 types of HPV that can infect the reproductive tracts of men and women. However, it has been determined that four types of HPV (types 16, 18, 31 and 45) are the pathogens that cause cervical cancer (US Department of Health and Human Services, 2000). College-aged women have been denoted as the group most "at risk" for HPV infection. Several factors contribute to this classification. These include younger age, multiple sexual partners, and early initiation of intercourse (Burk, Kelly & Feldman, 1996).

Cervical cancer has been a health issue for women for many years, but only recently have researchers and practitioners identified its primary cause as exposure to specific types of HPV. Of approximately 15,000 cases of cervical cancer in the United States every year, about one-third will die as a result of the disease.

Cervical cancer, detected in pre-cancerous or early stages, has a very high cure rate. Furthermore, women diagnosed with localized lesions to the cervix usually experience much less invasive treatment and their five-year survival rate is approximately 91-92% (Centers for Disease Control and Prevention, 1999; American Cancer Society, 2002). For women diagnosed with "distant" cervical cancer, the treatment becomes much more invasive and the five year survival rate declines to 15% (American Cancer Society, 2002).

Through the endeavors of the US Preventive Services Task Force (USPSTF), cervical cancer screening guidelines have been issued and updated in 1989, 1996 and 2003. The USPSTF was developed by the US Public Health Service to evaluate research to assess the efficacy of preventive efforts, including screening services. The 1996 guidelines state, "routine screening for cervical cancer with Papanicolaou (Pap) testing is recommended for all women who are or have been sexually active and who have a cervix. Pap smears should begin with the onset of sexual activity and should be repeated at least every 3 years" (USPSTF, 1996). The American Cancer Society, National Cancer Institute, American College of Obstetricians and Gynecologists (ACOG), American Medical Association, American Academy of Family Physicians (AAFP), and other organizations and agencies supported this recommendation.

In 2003, the USPSTF developed new recommendations for cervical cancer screening. The changes reflect the findings from current research as well as the December 2002 change in recommendations from the American Cancer Society. Essentially, the maximum age to begin screening has been increased from 18 years old to 21 years old and women between ages 65-70 may discontinue obtaining Pap tests (with a few caveats) (Twombly, 2002; Wright et al., 2002). The terms Pap test and cervical cancer screening are used interchangeably throughout this document.

The Pap test is the primary test to detect cervical abnormalities. If all women followed guidelines for annual gynecological exams, the rate of fatality due to cervical cancer would decline by 93.3%. In terms of cost, the diagnosis, treatment and follow-up care for women with early stages of cervical cancer is approximately $4500; this cost triples for women diagnosed with late, invasive cervical cancer (Centers for Disease Control and Prevention, 1999).

Statement of the Problem

The purpose of this study was to identify predisposing, reinforcing and enabling factors associated with college women's compliance with the "1996 Cervical Cancer Screening Guidelines" developed by the USPSTF because human papillomavirus and cervical cancer are recognized by federal health agencies as imperatives. *Healthy People 2010*, a national health agenda created by the US Department of Health and Human Services with support from agencies and organizations across the United States, cites HPV and cervical cancer as public health issues and identified specific objectives for intervention: objective 25.5," to reduce the proportion of persons with human papillomavirus (HPV) infection"; objective 3.4, "to reduce the death rate from cancer of the uterine cervix"; and objective 3.11, "to increase the proportion of women who receive a Pap test" (US Department of Health and Human Services, 2000).

A web-based survey was used to conduct research on a random sample of University of Florida female students. The random sample was created from all college women age 18 and older, undergraduate, graduate, and professional, enrolled at the University of Florida during the 2002-2003 school year. Seventeen explanatory variables were identified and analyzed to detect an association with the one outcome variable. A program written in the College of Health and Human Performance was used to convert a questionnaire adapted from three existing research instruments.

Some researchers have measured college students' knowledge about HPV, but no research to date has determined what additional factors contribute to college women's behavior for cervical cancer screening with an annual Pap test. This research specifically examined constructs identified by Green and Kreuter's Predisposing, Reinforcing, and Enabling Constructs in Educational/environmental Diagnosis and Evaluation (PRECEDE Model). These constructs provided a framework for the development of intervention strategies to improve cervical cancer screening behavior.

Research Questions

The following questions were investigated in this study:

1. What predisposing factors are associated with college women's cervical cancer screening behavior?
2. What reinforcing factors are associated with college women's cervical cancer screening behavior?
3. What enabling factors are associated with college women's cervical cancer screening behavior?

4. Was age associated with college women's cervical cancer screening behavior?
5. Was ethnicity associated with college women's cervical cancer screening behavior?

Significance of the Study

Federal health agencies and researchers in the United States recognize the significance of the incidence of HPV infection among young women. College-aged women are cited as those at greatest risk, specifically women 25 or younger (Koutsky, 1997). As a viral pathogen, HPV has no cure. The prevalence of this disease will continue to increase, as there is an estimated incidence of approximately 6 million new infections annually. Responsible sexual behavior among adolescents is one of the 10 leading health indicators of the national health objectives for 2010. Objective 25.11 is to "increase the proportion of adolescents who abstain from sexual intercourse or use condoms if currently sexually active to 95%."

Healthy People 2010 also has objectives specific to a "decrease in the incidence of HPV" (objective 25.5), a "reduction of the death rate from cancer of the uterine cervix" (objective 3.4) and to "increase the proportion of women who receive a Pap test" (objective 3.11).

This study provided data specifically derived from constructs identified by the PRECEDE model, a diagnostic tool that analyzes health behaviors. Green and Kreuter (1991) define predisposing factors as "antecedents to behavior that provide the rationale or motivation for the behavior"; reinforcing factors as "factors subsequent to a behavior that provide the continuing reward or incentive for the behavior and contribute to its persistence or repetition"; and enabling factors as "antecedents to behavior that enable a motivation to be realized" (p. 151). Collecting data within this framework enables health educators to identify prevalent factors for each construct and establish priorities within the categories for appropriate interventions.

The ultimate goal of this study was to identify which factors should be addressed in a prevention or intervention program to improve women's cervical cancer screening behaviors.

Delimitations

The following delimitations were observed for this research:

1. Participants were college women 18 years and over from the University of Florida, enrolled in undergraduate and graduate programs during the 2002-2003 academic year.
2. Data were collected in October 2003.
3. A survey questionnaire was developed and reformatted as a web-based data collection device to assess the influence of predisposing reinforcing, and enabling factors on women's cervical cancer screening behavior.

Limitations

The following limitations were observed for this research:

1. The time frame for data collection may have influenced responses.
2. Findings depended upon the ability of an instrument to accurately assess the influence of predisposing, reinforcing and enabling factors on women's behavior for cervical cancer screening.

Assumptions

The following assumptions were made for this research:

1. The sample adequately represented the population of University of Florida college women over the age of 18.
2. The data collected in Fall 2003 were adequate for the purpose of this study.
3. The instrument was adequate to obtain data necessary for the study.
4. Subject motivation and candor were adequate for the purpose of this study.

Definition of Terms

American Cancer Society (ACS) is a nationwide, community- based voluntary health organization committed to fighting cancer through balanced programs of research, education, patient service, advocacy, and rehabilitation.

American Social Health Association (ASHA) is a non-governmental agency that is dedicated to improving the health of individuals, families, and communities with a focus on preventing sexually transmitted diseases and their harmful consequences.

Cancer is a term for diseases in which abnormal cells divide without control. Cancer cells can invade nearby tissue and can spread through the bloodstream and lymphatic system to other parts of the body.

Cancer screening is checking for changes in tissue, cells, or fluids that may indicate the possibility of cancer when there are no symptoms.

Carcinoma is cancer that begins in the epithelial tissue that lines or covers an organ.

Centers for Disease Control and Prevention (CDC)is recognized as the lead federal agency for protecting the health and safety. CDC serves as the national focus for developing and applying disease prevention and control, environmental health, and health promotion and education activities designed to improve the health of the people of the United States.

Cervical Cancer Screening Guidelines were identified by the USPSTF with support from NCI, ACS, CDC and other national organizations as the standard recommendation for cervical cancer screening. The guidelines indicate all women over the age of 18 and/or all women who are sexually active should receive an annual gynecological exam that includes a Pap test.

Cervical dysplasia is abnormal tissue growth on the cervix that may progress to cancer if not treated in time.

College women are all females 18 and over enrolled at the University of Florida.

Cytology is the examination of cells obtained from body tissue or fluids, especially to establish if they are cancerous.

Distant cancer is cancer that has spread from the surface of the cervix to tissue deeper in the cervix or to other parts of the body.

Enabling factors are antecedents to behavior that enable a motivation to be realized.

Grade is a system for classifying cancer cells in terms of how abnormal they appear under a microscope. The grading system provides information about the probable growth rate of the tumor and its tendency to spread. The systems used to grade tumors vary with each type of cancer. Grading plays a role in treatment decisions.

Gynecological exam is a physical examination of a woman's reproductive organs that generally includes a visual examination, manual palpation of reproductive organs, and a Pap test for cytological abnormalities.

Healthy People 2010 is a publication created every ten years developed by the leading government and non-government health agencies in the United

States. The purpose is to provide national health goals for the country based on morbidity and mortality data, as well as objectives to help reach these goals.

Human papillomavirus is a viral pathogen; approximately 30 types cause infection of genital mucosal sites, and these genital types are generally characterized as "high-risk" types (e.g., HPV 16, 18, 31, 33, 35, 39, 45, 51, 52), which are associated with low- and high-grade squamous intraepithelial lesions (LSIL and HSIL) and invasive cancer, and "low-risk" types (e.g., HPV 6, 11, 42, 43, 44), which are primarily associated with genital warts, LSIL, and recurrent respiratory papillomatosis (RRP).

Invasive cervical cancer is cancer that has spread from the surface of the cervix to tissue deeper in the cervix or to other parts of the body.

Malignant means cancerous.

National Cancer Institute (NCI) was established under the National Cancer Act of 1937, NCI is the Federal Government's principal agency for cancer research and training.

Oncological means cancerous.

Papanicolaou (Pap) test is microscopic examination of cells collected from the cervix. The Pap test is used to detect cancer, changes in the cervix that may lead to cancer, and noncancerous conditions, such as infection or inflammation.

Pelvic exam is a physical exam that uses a speculum to view internal reproductive organs; also involves manual palpation of internal reproductive organs.

PRECEDE Model is a diagnostic health promotion planning framework; predisposing, reinforcing, and enabling constructs in educational/environmental diagnosis and evaluation.

Predisposing factors are antecedents to behavior that provide the rationale or motivation for the behavior.

Reinforcing factors are factors subsequent to a behavior that provide the continuing reward or incentive for the behavior and contribute to its persistence or repetition.

Risk factor is something that increases a person's chance of developing a disease.

Sexually transmitted disease is a pathogen that is transmitted through sexual intercourse.

Stage is the size and extent of a cancer, including whether the disease has spread from the original site into surrounding tissue and other parts of the body.

US Preventive Services Task Force is an organization developed by the US Public Health Service to evaluate research to assess the efficacy of preventive efforts, including screening services.

Summary

The incidence of HPV infection in the United States is greatest among sexually experienced young women. Certain strains of this pathogen have been determined to be causal agents of cervical cancer. Of the thousands of women diagnosed with cervical cancer annually, approximately one-third will die. A Pap test is the best method available for the early detection of cervical changes or abnormalities and thus for the early detection of possible cancer. Since previous research on HPV does not address the factors that motivate women to engage in early detection efforts, this study will assess the relationship between three constructs—predisposing, reinforcing and enabling—with cervical cancer screening behavior. Public health professionals may use these findings to identify these factors and design prevention and/or intervention programs tailored to detect or reduce cervical cancer incidence in the United States.

CHAPTER 2

REVIEW OF LITERATURE

This chapter provides an overview of the epidemic of sexually transmitted disease in the United States, with an emphasis on HPV incidence, prevalence, and the risk factors for infection. The associated risk between HPV infection and cervical cancer is outlined. Also discussed are the factors that influence a woman's behavior regarding cervical cancer screening. The PRECEDE Model for program planning is discussed as well as the choice of explanatory variables for the research. Finally, the efficacy of web-based surveillance for health behaviors is addressed.

Sexually Transmitted Disease in America

The United States has the highest rate of sexually transmitted disease of any country in the industrialized world (Advocates for Youth, 2002). Every year in the United States, an estimated 15-19 million people will become infected with a sexually transmitted disease (Centers for Disease Control and Prevention, 2003; Weinstock, Berman & Cates, 2004). Of those millions, approximately a third will have contracted human papillomavirus (HPV), the pathogen responsible for cervical cancer (National Cancer Institute, 2002).

Human papillomavirus is a viral pathogen that is transmitted through sexual intercourse and other sexual behaviors. Researchers estimate that there are approximately 70 types of HPV that can infect the reproductive tracts of men and women. However, it has been determined that four types of HPV (types 16, 18, 31 and 45) are the pathogens that cause cervical cancer (US Department of Health and Human Services, 2000). College-aged women have been denoted as the group most "at risk" for HPV infection. There are several factors that may contribute to this classification. Some risk factors suggested by the American Social Health Association include multiple sexual partners, decreased likelihood to use a barrier method, increased exposure to other STDs, and immature cervices.

Cervical cancer has been an issue for the health of women for many years, but it was not until recently that researchers and practitioners acknowledged the primary cause is exposure to specific types of HPV. There are approximately 15,000 cases of cervical cancer in the United States every year, and over one-third of this population will die as a result of the disease.

There is strong evidence that cervical cancer caught in pre-cancerous or early stages has a very high cure rate. A woman diagnosed with precancerous lesions to the cervix will usually experience a much less invasive treatment and the five-year survival rate is approximately 91% (Centers for Disease Control and Prevention, 1999). For a woman diagnosed with invasive cervical cancer, the treatment becomes much more invasive and the five year survival rate declines to 15% (American Cancer Society, 2002).

The National Cancer Institute recommends that all women over the age of 18 and/or all women who are sexually active receive an annual gynecological exam that includes a pelvic exam and Pap test. After three consecutive "normal"

Pap tests, the woman may change the protocol to having a Pap test once every three years with the advice of her gynecological care provider. The purpose of the Pap test is to collect a sample of cervical cells via a brush or swab for examination. The Pap test provides information on cervical abnormalities, but does not diagnose cancers. Follow up is advised for women who have abnormal results on Pap tests. The pelvic exam and Pap test are the primary tools to recognize potential cervical abnormalities. If all women followed the guidelines for annual gynecological exams, the rate of fatality due to cervical cancer would decline by 93.3%. The cost of diagnosis, treatment and follow-up care for women with early stages of cervical cancer is approximately $4500; this cost triples for women diagnosed with late, invasive cervical cancer (Centers for Disease Control and Prevention, 1999).

Recent research has shown an increase in the number of estimated new cases of sexually transmitted disease in the United States. Previously, researchers had considered 12 million to be the average number of STDs, as reported by the Centers for Disease Control and Prevention in 1988. However, better testing techniques indicate that an estimate of 15.3 million per year is a more accurate estimation for 1998, and the most current data estimates released in 2004 suggest rates as high as 18.9 million new infections (Weinstock, Berman & Cates, 2004).

There are several difficulties that researchers face when accounting for new cases and prevalence of STDs. Foremost, not all STDs require notification for surveillance. Currently, chlamydia, gonorrhea, syphilis, HIV, and hepatitis B are the only STDs that are reportable infections. While detection techniques for genital herpes and human papillomavirus (HPV) have improved, there are great limitations in their surveillance. These infections are estimated to account for 6.5 million new infections annually. Another problem with an accurate account for STDs is variation between state reporting and discrepancies between public and private care facilities

Other trends in STDs include a disproportionate number of infections occurring among youth. While youth aged 15-24 make up approximately 25% of the sexually experienced population in the United States, this group accounts for approximately 48% of new infections (Weinstock, Berman & Cates, 2004). There are many theories as to the nature of this trend. Researchers suggest that youth have more sexual partners, are less likely to use condoms, have older male partners, and engage in less communication about intimacy than do their older counterparts (National Campaign to Prevent Teen Pregnancy, 2001). One study conducted with adolescents in California found that there was a direct correlation between number of partners and risk for STD. They also found that adolescents reporting multiple sexual partners were more likely to be diagnosed with an STD (Rosenberg et al., 1999). Another study found that "condom complacency" might be an issue with today's youth. Younger college students relied more on hormonal methods (i.e., oral contraceptives, injectables, implants) for pregnancy prevention rather than barrier methods, eliminating the reduction of risk for disease (Siegel et al., 1999). The declining number of adolescent pregnancies supports this notion (as more female adolescents report use of more effective contraceptive methods), as there is no coinciding reduction in the number of adolescent sexually transmitted diseases (Darroch, 1999).

A final trend of note is the percentage of infections among adolescents. According to estimations by the American Social Health Association, one-third of all sexually active people under the age of 24 have a STD. The implications for this magnitude of infection are serious. Long-term effects of STDs vary in severity from infertility and the risk of perinatal transmission to death.

If STDs are examined from a cost perspective, the estimation for direct medical costs for STDs in the Unite States exceeds eight billion dollars. Over three-quarters of this expense derive from viral infections such as genital herpes, hepatitis B, HPV, and HIV. The annual direct cost associated with HPV is over 1.6 billion dollars, second only to direct cost associated with HIV infection (Centers for Disease Control and Prevention, 2003). Thus, Human papillomavirus and cervical cancer are recognized by national health agencies as imperatives. *Healthy People 2010*, a national health agenda created by the country's premiere health agencies, have cited HPV and cervical cancer as public health issues and, as indicated in the Statement of the Problem, have three objectives specific to reducing the number of persons affected by HPV and cervical cancer.

HPV Incidence, Prevalence and Diagnosis

Researchers from the American Social Health Association and Kaiser Family Foundation (1998) have deemed the "strength of surveillance evidence" for HPV as "poor". Finally, most of these infections are asymptomatic, making detection and reporting a challenge. HPV associated with cervical cancer, in particular, typically has no physical symptoms.

With 15-19 million new STDs annually in the United States, researchers have estimated the incidence of HPV to be 5.5 million, accounting for over one-third of all new STDs. The prevalence of HPV for 1996 was estimated at 20 million cases. As is the case with other viral infections, HPV remains in the body for life. Symptoms to HPV infection may emerge as early as weeks after exposure, or symptoms may not develop for several years. If the current estimate holds, HPV now infects more people in the United States than genital herpes (American Social Health Association, 1996).

According to Koutsky (1997), HPV has been present globally since the 1950s. It is found in most countries of the world, and the most common types of HPV vary geographically. A study in Iceland conducted in between 1985 and 1986 found that Finnish women had a 79% chance of having a HPV infection in their lifetime.

In the United States, many studies are finding the same trends. Several of the older studies (early 1990s) report findings from a one-time clinical diagnostic measure. A 1993 study of 357 college women in New Mexico (median age 23) reported that 44.3% of study participants were positive for HPV infection. Also of note, 28.8 of these participants had 2 or more types of HPV present during the screening. The researchers tested for HPV DNA and did not distinguish between types or level of risk associated with these types. The researchers support earlier suggestions that higher lifetime partners were significant for risk of HPV infection, along with younger age and being single (Wheeler et al. 1993).

Another study examined 439 sexually active women from inner city New York (median age 30) for evidence of HPV infection. The researchers presented a range for prevalence of HPV based on age. Thirty-six percent of women under 25 tested positive for HPV, while the percentage for women 45 and older was 2.8. Factors that were statistically significant in this study included age, marital status, and cohabitation (specifically, the number of partners within the past year or 10 or more partners in one's lifetime). Women under 30 tended to have high risk HPV as well as higher viral loads of HPV; this suggests a greater risk for the development of cervical cancer. Additionally, researchers hypothesized that the decrease in HPV prevalence with age may indicate possible immunity development (Burk et al., 1996).

A study conducted in 2000 continues to support the claims for the above research. Peyton, Garvitt and Hunt (2001) conducted research on 3863 women attending clinics for routine gynecological care. The women's ages ranged from 18 to 40, with a mean age of 28. For a single measurement for HPV detection, 39.2% of the women tested positive. The prevalence of high risk HPV and low risk HPV for these women was 26.7% and 14.7%, respectively. Significant factors for overall HPV infection included younger age, high number of lifetime partners, recency of new sexual partners, and being single

Several researchers have conducted longitudinal studies of women with repeated DNA testing for HPV. One such study involves a cohort of 205 college women (mean age 22.5) seeking routine care at a university health facility. After HPV DNA testing, 35% of the women were found to be infected with some type of HPV at enrollment. Within the 15-month time frame of the study, 51% of the women tested positive for HPV at some point in time. Multiple lifetime sexual partners were again significant for increases risk. The researchers also found that women with "high risk" types of HPV had a longer duration of infection as well as a higher viral load, when compared to those infected with "intermediate" or "low risk" types of HPV. Of note, almost one-third of women who tested positive for one type of HPV acquired a new type of HPV during the study. (Kotloff et al., 1998).

An ongoing longitudinal study of 1425 Brazilian women has very similar findings to those of Kotloff. At entry, 13.8% of these women tested positive for HPV DNA. After 18 months, there was a 38% cumulative positivity for HPV, an average of 1.3 new infections per month. HPV type 16 (a high risk type) was the most prevalent type of HPV detected, with 4.2% of the cohort being infected at some point during the study. As with the Kotloff study, the retention rate of the "high risk " types of HPV continued to be higher than those of "intermediate" or "low risk" (Franco, Villa & Sobrinho, 1999).

The most recent report for a longitudinal study was released in 2002 from researchers in Arizona. The reported measurements are for the years 1997 through 2000. The cohort included 331 women who attended a public clinic for routine gynecological care. The women were18 to 35 years of age who self-referred for routine gynecological care. Researchers collected baseline information regarding HPV status and types. After four months and ten months, cervical samples were collected again. The findings for this population included new HPV infections at a rate of 2.9% per month. Women who became newly infected were more likely to have HPV types that are considered oncogenic. This research also found that these oncogenic types took over twice as long to resolve as infections than the non-oncogenic types. Over the course of the study 53.5% of the women who participated had positive results for HPV. Finally, the researchers found statistical significance for the variable "one or more new sexual partners in the past three months" (Giuliano et al., 2002).

HPV and Cervical Cancer

In the United States, cancer mortality is the second leading cause of death. The American Cancer Society expects 1,284,000 new cancers to be diagnosed in 2002. Approximately 555,500 of these cases will result in death due to the cancer, a mortality rate over 43% (American Cancer Society, 2002). One tool researchers use for cancer morbidity is the five-year survival rate. This rate represents those who are living five years after their cancer diagnosis. It does not distinguish between those who are disease-free, in remission or in treatment.

The American Cancer Society estimates 13,000 new cases of cervical cancer in 2002, with approximately 4100 deaths attributed to this disease. The incidence of cervical cancer has been declining an average of 1.6% per year and when detected at an early stage, it is one of the most successfully treated cancers (American Cancer Society, 2002; Smith et al., 2002). The five-year survival rate is 92% when diagnosed at a “local” stage and 49% when detected at a “regional” stage. The survival rate drops significantly with later detection, the “distant” stage, at 15%. This outcome is one of the poorest of cancers with later diagnosis. Risk factors for cervical cancer are exposure to certain types of HPV, as well as early initiation of intercourse, many sexual partners, partners with many sexual partners, as well as cigarette smoking (American Cancer Society, 2002).

A study that examined mortality caused by STDs over a period of 20 years found that HPV contributed to more deaths that any other sexually transmitted pathogen. In 1973, cervical cancer accounted for 80% of STD deaths. This number had declined by 25% in 1992, but was still the leading cause of death, surpassing mortality attributed to HIV. Because this disease is easily diagnosed and treated in its early stages, the researchers cited their findings as “disappointing” (Ebrahim et al., 1997).

Researcher from a western university examined college women’s knowledge and perception of risk, and then compared it to actual risk via self-administered HPV testing. One hundred ten women with a mean age of 20 were recruited from a mailing to all age-eligible women as well as from university dormitories. The survey sought to measure knowledge as well as emotional reactions. The results concluded that women who reported increased confusion also reported lesser knowledge. Another association found was women with greater anxiety were more likely to have increase knowledge about HPV. Overall, these women reported a lack of association between perceived risk and actual risk. The sexually active women had difficulty identifying their own risk for HPV. Of the women who did not perceive themselves to be at risk for HPV, over half were tested for HPV. Thirty-five percent were found to be positive for the virus. Of the 51% of women who perceived themselves at risk for HPV, 71% were tested. This results for this group indicated that 36% had a positive test. The primary recommendation by the researchers was to improve education efforts (Ramirez et al., 1997).

Factors that influence the Pelvic Exam and Pap Test

Over the past ten years, some research studies have examined women's knowledge about HPV and cervical cancer. One study from the early 1990s indicated that 87% of sexually active college women from the sample had never heard of, or were unsure if they had heard of, HPV. These same women consistently reported engaging in behaviors that are considered to increase risk for HPV: almost half reported having had an STD, over one-third reported 4 or more partners and over one-third reported the age of first sexual intercourse to be at or below 15 years of age (Vail-Smith & White, 1992).

Women of color often have greater misconceptions than white women about HPV and the role of cervical cancer screening. From 1992-1993, Hubbell et al. (1996) conducted phone interviews with 1225 women in Orange County California. They assessed perceived risk factors for HPV as well as predictors for obtaining Pap tests. The sample included 533 immigrant Latinas, 270 US-born Latinas, and 422 Anglo women. Latin immigrant women tended to report a belief in non-causal risk factors (such as intercourse during menstruation) as well as an association between unwise or immoral behavior as a risk factor for cervical cancer. Latina immigrants also reported that they needed a Pap test only under certain conditions such as abnormal vaginal bleeding. Other significant positive predictors for having a Pap test among the immigrant Latina populations were having health insurance, higher levels of American acculturation, and being married. As with other studies that measure knowledge, attitudes and beliefs, these authors concur that education is important. However, they indicate it is not sufficient, particularly with this population. They also recommend cues to action (reminders about regular Pap tests) and providing screening services to all women, regardless of insurance or income status.

The research over the past decade indicates the need for better education. Young women consistently report little knowledge about HPV and/or the guidelines and purpose of a pelvic exam and Pap test. Some recommendations include using the clinic setting to educate women, using the "teachable moment". (Lambert, 2001). Others advocate literature about HPV and Pap and pelvic exam. (Hewitt, Devesa & Breen, 2002; Vail-Smith & White, 1992). Most acknowledge that information is not sufficient, but suggest it as a means of opening the lines of communication about HPV and its sequelae (Nguyen et al., 2002 Hasenyager, 1999; Yacobi et al., 1999; Hubbell et al. 1996). Finally, others recommend targeting interventions to providers (Brody, Kohler & Rask, 2000).

Due to lower compliance rates—91%, 88%, and 75% among white women, black women and Hispanic women, respectively in 1987— women over the age of 45 and women of color have been priority populations for improving compliance with cervical cancer screening (US Department of Health and Human Services, 2000; Centers for Disease Control and Prevention, 1998). Overall screening compliance by women in the United States is 92% for those that report ever having had a screening and 79% for those reporting an exam within the past 3 years. The *Healthy People 2010* objectives are, respectively, 97% and 90%. For examinations within the past three years, white (non Hispanic) women report an 80% compliance rate, black (non Hispanic) women report an 83% compliance rate, and Hispanic women report a 74% compliance rate. Women with less education and women beyond traditional childbearing age (beyond 45) report significantly lower compliance for cervical cancer screening (American Cancer Society, 2002; US Department of Health and Human Services, 2000).

PRECEDE Model

The PRECEDE Model was developed by Lawrence Green and Marshall Kreuter in the 1970s to provide a needs assessment method for health promotion activities. This planning framework consists of predisposing, reinforcing and enabling constructs in education and/or environmental diagnosis. The model is considered a useful tool for practitioners interested in health behavior change (Glanz, Lewis & Rimer, Eds., 1997).

The diagnostic section of this model is comprised of five phases: 1) Social diagnoses—assessing the quality of life for the target population; 2) Epidemiological diagnoses – identification of the specific health goals that may contribute to the social goals or problems found in Phase 1; 3) Behavioral and environmental diagnoses – identification of specific behavioral and environmental factors that could be linked to the health problems found to be the priorities from Phase 2; 4) Educational and organizational diagnosis - identifying the predisposing, reinforcing and enabling factors that contribute most significantly to the target behavior of interest; and 5) Administrative and policy diagnosis – assessment of the capabilities for the development and implementation of a program for the target population.

Green and Kreuter (1991) define predisposing factors as "antecedents to behavior that provide the rationale or motivation for the behavior"; reinforcing factors as "factors subsequent to a behavior that provide the continuing reward or incentive for the behavior and contribute to its persistence or repetition"; and enabling factors are "antecedents to behavior that enable a motivation to be realized" (p.151). Figure 1 provides and overview of the PRECEDE Model and the constructs of interest for this research.

Predisposing Constructs

Knowledge, attitudes and beliefs are identified as the primary qualifiers for predisposing behaviors. Several researchers have specifically conducted investigation on what women know about HPV, cervical cancer, and cervical cancer screening, as well as the resulting attitudes and beliefs from this knowledge. Therefore, the first nine constructs of interest are as follows: 1) knowledge of HPV (Lambert, 2001; Yacobi et al., 1999; Ramirez et al., 1997; Vail-Smith & White, 1992); 2) knowledge of cervical cancer (Ramirez et al., 2000); 3) knowledge of cervical cancer screening

(Hasenyager, 1999; Ramirez et al., 1997); 4) attitudes about HPV (Ramirez et al., 1997); 5) attitudes about cervical cancer (Ramirez et al., 2000); 6) attitudes about cervical cancer screening (Ramirez et al., 1997); 7) beliefs

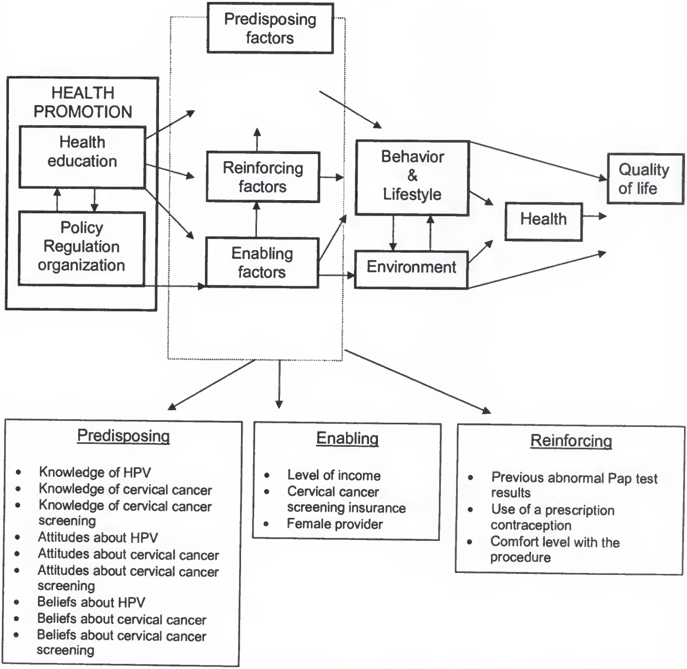
Predisposing factors
HEALTH PROMOTION
Health education
Policy Regulation organization
Reinforcing factors
Enabling factors
Behavior & Lifestyle
Environment
Health
Quality of life
Predisposing
Knowledge of HPV
Knowledge of cervical cancer
Knowledge of cervical cancer screening
Attitudes about HPV
Attitudes about cervical cancer
Attitudes about cervical cancer screening
Beliefs about HPV
Beliefs about cervical cancer
Beliefs about cervical cancer screening
Enabling
Level of income
Cervical cancer screening insurance
Female provider
Reinforcing
Previous abnormal Pap test results
Use of a prescription contraception
Comfort level with the procedure

FIGURE 1: PRECEDE Model; Applications of PRECEDE Model to Evaluation of Cervical Cancer Screening Behavior (Green and Kreuter)

about HPV (Hubbell et al., 1996); 8) beliefs about cervical cancer (Hubbell et al., 1996); and 9) beliefs about cervical cancer screening (Hubbell et al., 1996).

Knowledge, attitudes and beliefs appear to be the constructs with the greatest amount of existing research. As a result, several instruments were available to construct the questionnaire for this research. Following is a description of instruments that were utilized to create the predisposing items for the final study.

The first instrument was developed by Dr. Allen Hubbell et al. (1996) of the University of California, Irvine and administered as a telephone survey in 1992-93 via random-digit dialing. The research surveyed Latina and Anglo women in Orange County, California to assess beliefs about breast and cervical cancer and early detection methods. This questionnaire was adapted from national surveys and an ethnographic study and included over 1200 respondents.

Dr. Anna-Barbara Moscicki and colleagues from the University of California, San Francisco developed the second instrument. This questionnaire specifically assessed college women's knowledge about HPV, as well as perceived and actual risk. All age-eligible women enrolled in the university were solicited through the mail and through dormitory recruiting. Participants completed the questionnaire at the student medical clinic and were offered free, self-administered HPV testing. Over 100 women with a mean age of 20 completed the questionnaire (Ramirez et al., 1997).

Dr. Richard Roetzheim, and colleagues from the University of South Florida, developed the third questionnaire. This research also specifically targeted college students and measured knowledge and awareness of HPV. This questionnaire had 289 males and females respondents (60%). This was a self-administered, 54-item instrument that was administered via mail (Yacobi et al., 1999).

Enabling Constructs

Enabling variables that have been identified in the literature include: 1) level of income (Hofer & Katz, 1996; Hsia et al., 2000; Chamot, Charvet & Perneger 2001; Hewitt, Devesa & Breen, 2002; American Cancer Society, 2002); 2) cervical cancer screening insurance (Hubbell et al., 1996; Hsia et al., 2000; Hiatt et al., 2001; American Cancer Society, 2002; Hewitt, Devesa & Breen, 2002); and 3) a female provider (Brody, Kohler & Rask, 2000; Nguyen et al., 2002).

In a study conducted by Drs. Timothy Hofer and Steven Katz (1996), the researchers found that healthy behaviors for Canadian and American women were better, in general, for women who obtained higher education as well as a greater income. Both of these factors contributed to the likelihood that women would undergo preventive screening services, including the Pap test. Ultimately, the researchers found that, when controlling for other covariates including education, there was a linear increase in the use of preventive services as income level increased.

Dr. Judith Hsia and colleagues (2000) also found level one's level of income, as well as health insurance status, to contribute to the likelihood of cancer screening behavior. Using data collected as part of the Women's Health Initiative Observational Study from over 55,000 women, the researchers conducted a multiple logistic regression to identify predictors of screening behaviors, including the Pap test. Variables found to be statistically significant for undesirable cervical cancer screening behaviors included no usual medical care provider, no health insurance, and income below $20,000 per year.

To determine what factors predicted the adoption of mammography screening. Chamot, Charvet, and Perneger (2001) collected data from a random sampling of 909 Swiss women, aged 40 – 80 years. These researchers developed explanatory variables from predisposing, enabling and reinforcing characteristics to ascertain their relationship to the outcome variable of mammography screening behavior. All of the enabling characteristics – income, reluctance to pay for a mammogram, and perceived usefulness of mammography—were found to be significant for predicting the adoption of mammography screening. A history of breast biopsy, a reinforcing characteristic, also indicated a greater likelihood of positive mammography practice.

To discover which cervical cancer risk factors were associated with annual Pap test, Hewitt, Devesa and Breen (2002) used data collected for the 1995 National Survey on Family Growth. This survey was collected from almost 11,000 women aged 15 – 55 years. A logistic regression model and variance estimates for proportions were used to find significant risk factors associated with

Pap test behavior. Their findings suggest that women with specific risk factors (early initiation of intercourse, multiple partners and previous sexually transmitted infection) and those who identified as African American were more likely to have had a Pap test in the past year. Annual Pap test behavior was significantly lower among women who were uninsured, of low-income status, lower educational attainment, foreign-born, or identified as "other" in the race/ethnicity category.

Research conducted by Brody, Kohler, and Rask (2000) assessed what physician and patient characteristics were associated with adherence to the primary prevention practices of breast cancer and cervical cancer screening. The retrospective medical records review of patients from four Atlanta, Georgia primary care clinics' population included 598 women ages 21-69 randomly selected to comprise the sample. Using a multivariate logistic regression model, the researchers found that care from a female provider, three or more office visits and having received a mammogram were positively associated with engaging in cervical cancer screening.

Nyugen and colleagues (2002) had similar findings when considering predictors for Pap testing among Vietnamese-American women. This study used a telephone survey to interview 1566 women (response rate of 58%) 18 and over in two cities in California and Texas, respectively. This research measured these predictors through the following outcomes: awareness of the Pap test, intention to obtain a Pap test and actual receipt of a Pap test. Using a multiple logistic regression model, the researchers concluded that women in this sample aged 65 and over had the poorest rate for all three outcome measures. Factors that contributed to the intention of having a Pap test, as well as receipt of a Pap test, were younger age, married, higher level of education, a female provider, and a respectful provider. Additional factors that support receipt of a Pap test were the participant requesting the test and a physician recommendation for the test.

Reinforcing Constructs

Reinforcing variables, or constructs that support cervical cancer screening behavior subsequent to having engaged in a screening, that have been identified in the literature include: 1) previous abnormal Pap test results (Chamot et al., 2001) with research cited in prior construct; 2) use of a prescription contraception (Eaker, Adami, & Sparen, 2001); and, 3) emotional and physical comfort level with the procedure (Egbert & Parrott, 2001).

Eaker, Adami, and Sparen (2001) surveyed over 900 Swedish women to find out what factors deter women from attending cervical cancer screenings. The women surveyed were divided into groups of attendees (n=514) with a response rate of 80.7% and non-attendees (n=430) with a response rate of 69%. Non-attendees were defined as women 30-59 who had not had a Pap test within the previous five years, or women 25-29 who had not had a Pap test within the previous three years. Their hypothesis was that the following factors would influence participants' cervical cancer screening behavior: 1) socioeconomics and demographics; 2) genital symptoms and contraceptive use; 3) gynecological exams; 4) risk behaviors; 5) perceived health status and participation in other health-related activities; and 6) knowledge and received information about the Pap test and cervical cancer.

A logistic regression was used to determine if any of the variables explained the participants' cervical cancer screening behavior. Their findings suggested that the strongest predictors for nonattendance of cervical cancer screening were use of nonprescription (e.g., condoms) or no contraception at all, fewer than five visits to a physician per year, women who visited different gynecologists, and women who did not initiate their own cervical cancer screening. These researchers suggested that health practitioners should improve communication efforts regarding the Pap test and benefits. These improvements should be conducted with face-to-face interactions as well as paper communications.

Perceived self-efficacy was the outcome variable of interest in research conducted by Egbert and Parrott (2001). These researchers surveyed 204 rural women with an average age of 48 to determine what variables influence one's perceived self-efficacy of breast and cervical cancer detection practices. The constructs of interest were 1) perceived and actual knowledge of breast and cervical cancer detection; 2) perceived social norms relating to cancer screening practices; and 3) perceived barriers to cancer detection practices. These barriers included cost, comfort, embarrassment and time. A random sample of farm-women were interviewed. Factor analysis determined perceived barriers to cancer screening behaviors, a 17-item Likert scale was used (responses ranging from 1= strongly disagree to 5 = strongly agree) with time and embarrassment as statistically significant. As a result of this study, the researchers made the following recommendations for health care providers: 1) make direct reference to cancer detection prevention barriers when communicating about these health practices; 2) to improve self-efficacy, health communication for cancer prevention should include acknowledgment of time and embarrassment to improve the likelihood of engaging in cancer screening behaviors; 3) health messages should support the population's perceived knowledge. This variable was found to be significant when predicting screening behavior; and 4) involve the social network with health communication because positive familial behaviors supported cervical cancer screening behaviors.

Web-based Research Methods

The use of the world-wide web to conduct survey research is fairly new. As more people have access to computers and Internet services, the feasibility of using this resource for data collection has come into question. One question addressed by researchers is whether response rates would be comparable between a web-based questionnaire and a traditional mailed questionnaire. When a true experimental design looked at response rates among college students completing a web-based instrument and those completing an instrument from the mail, there was no statistical difference (Pealer et al., 2001). Researchers have also found that web-based surveys may increase response rates for sensitive questions, and decrease turnaround time (Schleyer & Forrest, 2000; Pealer et al., 2001; Daley et al., 2003). A 60 minute phone card was included as an incentive per the professional judgment of the supervisory committee.

Summary

This chapter provides an overview of the research to date on issues to specific to HPV, cervical cancer and screening methods. Particular attention was paid to the of sexually transmitted disease epidemic in the United States, (including HPV incidence, prevalence, and the risk factors for infection). Also of interest were the associated risk between HPV infection and cervical cancer and factors that influence a woman's behavior regarding cervical cancer screening.

The PRECEDE Model was selected due to its usefulness as a planning model for behavior change as well as the model's consideration of collective causation for behavior. The explanatory variables for Predisposing factors found in research to date included knowledge of HPV; knowledge of cervical cancer; knowledge of cervical cancer screening; attitudes about HPV; attitudes about cervical cancer; attitudes about cervical cancer screening; beliefs about HPV; beliefs about cervical cancer; and, beliefs about cervical cancer screening. The variables connected with Enabling factors included one's level of income; cervical cancer screening insurance; and having or preferring a female provider. Finally, research on the variable connected with Reinforcing variables included previous abnormal Pap test results; use of a prescription contraception; and one's physical and emotional comfort level with the procedure.

Web-based data collection methods were deemed appropriate for this study because, while the research showed no decrease in response, this method may increase response rate to sensitive questions as well as turnaround time for data collection.

CHAPTER 3
METHODOLOGY

This study examined the predisposing reinforcing and enabling constructs for women that explain behavior for an annual Pap test. The research questions addressed were: 1) What predisposing factors are associated with college women's cervical cancer screening behavior? 2) What reinforcing factors are associated with college women's cervical cancer screening behavior? 3) What enabling factors are associated with college women's cervical cancer screening behavior? 4) Was age associated with college women's cervical cancer screening behavior? and, 5) Was ethnicity associated with college women's cervical cancer screening behavior?

The subjects were randomly selected from all female students enrolled at the University of Florida during the Fall 2002 – 2003 school term. This chapter presents the methodology used in this study and describes how an assessment tool was developed. This chapter is delineated into the following sections: Research Design, Research Variables, Scale Development, Pilot Study, Final Study, and Data Collection and Analysis.

Research Design and Sample

This study used a cross-sectional survey design. Females enrolled at the University of Florida were randomly selected to complete an on-line questionnaire assessing cervical cancer screening behavior. The University of

Florida is one of the largest public education facilities in the east as well as one of the most academically diverse. Florida has 21 colleges and schools and more than 100 research, service and education centers, bureaus and institutes. The University offers more than 100 undergraduate degrees and the graduate school coordinates almost 200 graduate programs. The University enrolled almost 47,000 students for undergraduate, graduate and professional programs in Fall 2002. The student body represents all Florida counties, with an additional 2,700 international students representing over 100 countries, with the remainder representing all 49 of the other states, the District of Columbia, Puerto Rico, and the Virgin Islands (University of Florida, 2003).

Research Variables

The independent variables in this study may be categorized within three educational/organizational constructs from the PRECEDE Model. Fifteen variables were identified within these three categories. In addition, two demographic variables -- age and race/ethnicity -- also served as explanatory variables, resulting in a total of 17 explanatory variables. A multiple logistic regression analysis was used to explore how much of the variance in cancer screening behavior could be explained by the predisposing, enabling and reinforcing constructs as well as the demographic data.

Explanatory Variables

Variables under Predisposing factors, identified through the review of the literature, were: 1) knowledge of HPV (Vail-Smith & White, 1992; Ramirez et al., 1997; Yacobi et al., 1999; Lambert, 2001); 2) knowledge of cervical cancer

(Hasenyager, 1999); 3) knowledge of screening guidelines (Hasenyager, 1999; Ramirez et al., 2000); 4) attitudes about HPV (Ramirez et al., 1997); 5) attitudes about cervical cancer (Ramirez et al., 2000); 6) attitudes about cervical cancer screening (Ramirez et al., 1997); 7) beliefs about HPV (Ramirez et al., 1997); 8) beliefs about cervical cancer (Hubbell et al.,1996); and 9) beliefs about cervical cancer screening (Hubbell et al., 1996).

No instruments that have measured variables related to enabling and reinforcing factors involved in predicting cervical cancer screening behavior were found. Thus, the remainder of the instrument was constructed based on the PRECEDE Model (Green & Kreuter, 1991) with regard to the recommendations for cervical cancer screening by the USPFTF and findings from research on cancer screening behaviors.

Enabling variables that were identified included: 1) level of income (Hofer & Katz, 1996; Hsia et al., 2000; Chamot, Charvet & Perneger, 2001; Hewitt, Devesa & Breen, 2002; American Cancer Society, 2002); 2) cervical cancer screening insurance (Hubbell et al., 1996; Hsia et al., 2000; Hiatt et al., 2001; American Cancer Society, 2002; Hewitt, Devesa & Breen, 2002); and 3) a female provider (Brody, Kohler & Rask, 2000; Nguyen et al., 2002).

Reinforcing variables that were identified included: 1) previous abnormal Pap test results (Chamot, Charvet & Perneger, 2001); 2) use of a prescription contraception (Eaker, Adami & Sparen, 2001); and, 3) comfort level with the procedure (Egbert & Parrott, 2001).

Outcome Variable

The outcome variable for this study was the cervical cancer screening behavior of the participants. Specifically, the behavior was defined as having had a Pap test within the calendar year preceding the completion of the survey instrument. This was a categorical variable and was measured by a yes or no response.

Scale Development

Rationale for Using a Computer-based Questionnaire

Survey research conducted via a web-based method offers low cost, ease and convenience as well as rapid responses as some of the advantages over other types of designs (McDermott and Sarvela, 1999). Recent research found that there were no significant differences in the response rates between students taking a web survey when compared to a mailed survey (Pealer et al., 2001; Daley et al., 2003). Advantages cited for this method included less time than traditional methods; greater completion for items deemed socially threatening, decreases turnaround time and decreased cost (Schleyer & Forrest, 2000; Pealer et al., 2001; Daley et al., 2003).

Scale Adaptation

The instrument for this research included items from each of the existing questionnaires as well as items developed by the researcher. The initial 100-item questionnaire was developed using items from three existing instruments (described above from researchers Hubbell, Moscicki and Roetzheim) to measure the variables addressing predisposing factors (Appendix C). Items to measure variables connected with enabling and reinforcing factors were developed based on cancer screening guidelines and findings from a search of the literature (USPSTF, 1996; ACS 2002).

Panel of Experts

A panel of three experts reviewed the instrument for content. Dr. Virginia Noland, faculty member in Health Science Education, researcher and educator on sexuality and adolescent health at the University of Florida; Ms. Pamela Taylor, Nurse Practitioner, provider at the University of Florida Student Health Care Center Women's Health Clinic; and Dr. Elissa Howard, faculty member in Health Education at Coastal Carolina University in Myrtle Beach SC, educator in sexuality, research and epidemiology (Appendix D).

The expert panel was asked to select the best five items per section (with an average of 10-20 existing items per scale) as well as suggest additional items or ideas on improving each section. As a result, the number of items per scale were reduced and two additional items were included prior to the item analysis. Feedback was summarized and applied to questionnaire revisions (Appendices E & F).

Pilot Study

After incorporating the changes based on the expert panel review, a program written by staff within the University of Florida College of Health and Human Performance specifically for web-based data collection was utilized to develop the web-based instrument. This program allows for data collection to be summarized in html tables. The data collected was then copied into Excel and, finally, transferred into SPSS™ for data analysis.

Two pilot studies were conducted. By conducting pilot testing specific to content as well as methodology, the researcher was able to detect and correct problems before the survey was implemented on a large scale (McDermott & Sarvela, 1999).

For the primary pilot test, 20 female volunteers were solicited from a personal and family health course within the College of Health and Human Performance. Participants completed the instrument with paper and pencil. The individuals were asked to assess the readability, clarity and flow of the instrument. These participants were also asked to provide suggestions for improvement of the questionnaire as well as any general comments (Appendices G & H). The second pilot study was conducted via the web. Twenty-four volunteers that fit the population description were emailed the instructions, IRB consent, and the link to the questionnaire site. They were instructed to complete the questionnaire and included feedback about the design and user-friendliness of the study within a textbox at the conclusion of the instrument.

Feedback solicited from the two pilot tests indicated that most participants had little difficulty following the directions of the instrument, but were unfamiliar with some of the terminology (e.g., human papillomavirus). As assessing knowledge was an objective of the research, these terms were not changed. Participants involved in the web-based data collection had no difficulty with the design or indicating responses. As a result, no significant changes were made to the instrument design.

Reliability

The responses from the web-based data collection and original paper data collection were combined to run reliability tests. Item total correlation was used to measure reliability for the items within the scale; this allowed the researcher to assess if the items were adequate for measurement. Items with negative or low correlation were removed. The reliability of each of the 15 scales was calculated using Cronbach's measure of internal consistency. This test provides a measure of reliability for length-adjusted, inter-item consistency appropriate for tests with items with three or more answer options (Dooley, 2001). A criterion of .70 was established as an acceptable level of reliability for Cronbach' s alpha (McDermott & Sarvela, p. 139).

Thirty-one women provided responses for the pilot test phase. As a result, 34 items were removed from the initial instrument, increasing the alpha score for all scales. Additional changes included the removal of the answer option of "Not sure" for categorical responses. The final questionnaire was comprised of 66 items (Appendix J). See Table 3.1 for reliability scores for the Predisposing constructs.

Participants

Of the 47,000 students enrolled Fall 2002 at UF, over 24,000 were women, or 51.4%. Table 3.2 shows the distribution of enrollees by age and ethnicity.

Table 3.1 Pilot Test Reliability Scores for Predisposing Constructs

Scale	# of items	Item-total correlation range	Alpha
Knowledge of HPV	5	.3362 to .6869	.7553
Knowledge of cervical cancer	4	.6967 to .8315	.8764
Knowledge of cervical cancer screening	5	.4472 to .6637	.7394
Attitudes about HPV	7	.3395 to .8897	.8687
Attitudes about cervical cancer	7	.3727 to .8227	.8926
Attitudes about cervical cancer screening	7	.5591 to .7020	.8034
Beliefs about HPV	3	.6089 to .6851	.7319
Beliefs about cervical cancer	3	.3780 to .4774	.4757
Beliefs about cervical cancer screening	3	.3393 to .6134	.6508

n=31

Table 3.2 Distribution of Students by Age and Ethnicity in Fall 2002

Age*	Percent	Ethnicity**	Percent
18 - 19	21.5	White	69.0
20 - 21	27.0	Hispanic	9.5
22 - 23	14.5	Black	7.0
24 - 25	6.0	Asian	6.0
26 - 27	3.5	American Indian	0.5
28 - 30	3.5	Non-resident Alien	6.0
31+	24.0	Not Reported	< 2.0

* Includes only female students
**Includes male and female students

Females enrolled at the University of Florida were randomly selected to complete an on-line questionnaire assessing cervical cancer screening behavior. The use of randomization increases the external validity of the researcher's findings (Shavelson, 1996). The University of Florida requires all enrolled to students to obtain a Gatorlink email account at the time of enrollment. This requirement afforded the researcher the opportunity to obtain the desired random sample via a request, including the desired number of participants and appropriate demographics, to the University Registrar's Office. Using the list of email addresses provided by the Registrar's Office, women were e-mailed letters asking them to participate. In order to participate in this study, women were screened to make sure that they were 18 years old or older and classified as undergraduate, graduate, or professional full-time students.

IRB Approval and Confidentiality

The University of Florida Institutional Review Board approved the survey instrument and data collection on May 15, 2003 (Appendices A & B). All participants received a description of the study and information about their rights as participants. Participation was voluntary and anonymous (unless participant information was provided for the incentive). An on-line consent was obtained from all participants.

Data Collection and Analysis

Sample Size and Power

Computer software was used to determine an appropriate sample size and minimize the chances that an actual effect would not be found (Type I Error). An acceptable sample size was established as 151 participants with power=.80, α=.05 and the effect size set at .15. G*Power (Erdfelder & Buchner, 1996), a general power analysis program available on-line at no charge, determined the sample size and was cross-referenced with guidelines established by Cohen and Cohen (1983). Ultimately, the researcher elected to increase the sample size to 400.

Data Collection

The data collection procedure was modeled after the recommendations from *Mail and Internet Surveys: The Tailored Design Method, 2nd ed.* (Dillman, 2000). A pre-notification email message was sent to all participants on September 24, 2003 (Appendix K), alerting them that a website link would be forthcoming. Two days later, a message with the website link was emailed to the sample. Once the participants accessed the questionnaire's website, a cover page and consent form appeared before the start of the questionnaire (Appendix L). It described the nature of the research, requested cooperation from participants, assured the confidentiality and privacy of the responses, and described how the questionnaire was to be completed.

Three days after the questionnaire's website link was sent to the sample, a follow-up email message was sent (Appendix M). A second reminder was sent 6 days after the initial website link was provided to invite those who had not replied with the opportunity to participate in the study. A third contact was made after another three-day interval (Appendix N).

A total of 400 potential participants received an invitation to respond. Questionnaires were received from 159 participants, yielding a final response rate of 40%. While the objective for the researcher was to obtain a 50% response rate, data collection was ceased after following the Dillman protocol. A follow-up mailing with a thank you and the incentive were then sent to those participants supplying a mailing address (Appendix O).

Data Analysis

Questionnaires were collected on-line. Data were then downloaded into Microsoft Excel 2000, and subsequently, uploaded into SPSS version 11.5 for analysis.

Data were analyzed using descriptive and inferential statistics. Descriptive statistics provided a profile of the sample including demographics and cervical cancer screening behavior. Multiple logistic regression analyses were used to examine the relationship between each explanatory variable and cervical cancer screening behavior. A significance level of $p < .05$ was set for all data analyses.

Summary

This study examined 17 explanatory variables and one outcome variable. The majority of explanatory variables were classified into three major constructs of the PRECEDE model, while the outcome variable ascertained cervical cancer screening behavior. A cross-sectional survey research design was implemented with women from the University of Florida to address the study's five research questions. This chapter described the study's research design, research variables, scale development, pilot study, final study, and data collection and analysis.

CHAPTER 4
RESULTS

The research questions addressed in this study were: 1) What predisposing factors are associated with college women's cervical cancer screening behavior? 2) What reinforcing factors are associated with college women's cervical cancer screening behavior? 3) What enabling factors are associated with college women's cervical cancer screening behavior? 4) Was age associated with college women's cervical cancer screening behavior? and, 5) Was ethnicity associated with college women's cervical cancer screening behavior?

This chapter presents the results from the study and is organized into five sections. The first provides sample demographics and characteristics. The second section examines the results of preliminary statistical significance testing, conducted to ascertain which variables should be included in the regression models. Finally, the research questions are addressed

Study Demographics and Characteristics

The population, as defined for this study, were women enrolled full-time at the University of Florida during the Fall 2002 term. This included over 24,000 women of all ages and races enrolled in undergraduate, graduate and professional programs. Of the 400 e-mail randomly selected solicitations for participation, six e-mail accounts were undeliverables, cited as "user unknown or "fatal errors". Three women requested the removal of their names from the list as they were not full-time UF students or were distance education students. After a pre-notification email, an initial contact, and three reminders with the questionnaire link, 159 women completed the on-line survey questionnaire, achieving a response rate of 40%. Although this response rate was lower than expected, the lower response was accepted on the basis that: 1) the data was a true random sample of the population of interest, thus it increases the likelihood that collected data will be representative of the population of interest and decreases the likelihood of sampling bias (McDermott and Sarvella, 1999) and sampling error (Agresti, 1986); and 2) a sample of 151 is an appropriate sample size (with power=.80, a=.05, effect size set at .15 and 17 independent variables) and will adequately minimize the chances that an actual effect would not be found (Type I Error) (Cohen and Cohen, 1983).

A review of the literature that examined response rates of survey research with sexuality content indicated that these findings might be typical adequate. Assessing the adequacy of the response rate was difficult, as most research around sexuality behavior and decision making utilizes convenience samples or existing pools of data. Random telephone surveys' response rates ranged from 58% to 83% (Hsia, Kemper, Kief et al. 2000 and Nguyen, McPhee, Nguyen et al. 2002, respectively). Among college populations, response rates ranged from 3% (Ramirez, Ramos, Clayton et al. 1997) to 60% (Yacobi, Tennant, Ferrante et al. 1999).

Demographics by Age, Enrollment Status and Race/Ethnicity

Participants' ages ranged from 18 to 55 with 18-25 year olds accounting for 61.6% and 26-55 year old women accounting for 38.4% of the participants. Undergraduates comprised 46.5% of the respondents, whereas graduate and professional students equaled 37.5% and 15.6%, respectively. The mean age was 28.6 and the standard deviation was 8.959.

Table 4-1. Distribution of Participants by Age, Enrollment Status and Race/Ethnicity

	f	%
Age		
18 - 19	14	8.8
20 - 21	45	28.3
22 - 23	24	15.0
24 - 25	15	9.5
26 - 27	9	5.6
28 - 30	12	7.6
31+	38	24.3
Total	156	
Enrollment Status		
Undergraduate	74	46.3
Graduate	60	37.5
Professional	25	15.6
Total	159	
Race		
White	139	86.9
Latina/Hispanic	6	3.8
Black	5	3.1
Asian/Pac Islander	4	2.5
Other	4	2.5
Total	158	

The majority of the participants were white (86.9%) with the remainder of women reporting their race or ethnicity to be Latina/Hispanic (3.8%), Black (3.1%), Asian/Pacific Islander (2.5 %), and other (2.5%). Religion was reported as follows: Catholic (31.9%), Protestant (22.5%), Jewish (6.9%), Other (11.3%), and not religious (26.9%). As seen in Table 3.2, in terms of representing all female UF students, women in this study aged 26 and older were slightly over-represented (7.4%), white women were over-represented (17.9%), and all other races were slightly under-represented. Results are summarized in Table 4-1.

Participants by Income, Marital Status, Cohabitation and Religion

The majority of study participants had an annual household income below 20,000 dollars. Women with an income less than $10,000 accounted for 45.6% of the sample, and women with an income between 10,000 dollars and 19,999 dollars accounted for 30% of the sample. Participants with incomes between 20,000 and 29,000 dollars and 30,000 and 49,000 dollars, were represented by

Table 4-2. Distribution of Participants by Income, Marital Status, Cohabitation with a Partner, and Religion

	f	%
Income ($)		
0-9999	73	45.6
10000-19999	48	30.0
20000-29000	10	6.3
30000-49000	11	6.9
50000+	16	10.1
Total	160	
Marital status		
Single	117	73.6
Married	34	21.4
Divorced/Separated	8	5.0
Total	159	
Live with a partner (if not married)		
Yes	23	14.5
No	102	64.2
Religion		
Catholic	51	31.9
Protestant	36	22.5
Jewish	11	6.9
Other	18	11.3
Not religious	43	26.9
Total	160	

6.3% and 6.9% respectively; finally, women with annual household incomes over 50,000 dollars comprised 10.1% of the sample.

The majority of study participants were never married (73.6%). Twenty one point four percent reported currently being married and 5.0% reported being separated or divorced. Of those not married, 14.5% report living with a partner. Most respondents designated membership in an organized religion (73.1%) whereas 26.9% did not describe themselves as religious. Table 4-2 summarizes these findings.

Variables Within Predisposing Constructs (knowledge, attitudes and beliefs)

Score Distribution

Participant responses were collected via a Likert scale with response options including "not at all", "a little", "moderately", "quite a bit" and "extremely". The two scores from either end of the Likert scale were combined for a cumulative score. This was done to model the data collection methods from the original instruments, thus allowing for a comparison of findings.

Knowledge scores indicated that participants knew most about cervical cancer screening, followed by cervical cancer and least about HPV with an average percent of correct responses of 79%, 65%, and 60%, respectively. Table 4-3 summarizes the results of the knowledge assessment.

Attitudes about HPV varied greatly. While the majority indicated that they would feel "not at all or "a little" vengeful, guilty, dirty or deceived if they tested positive for HPV (72%, 52% 55%, 50%, respectively) most respondents would feel "quite a bit" or extremely" scared and anxious if they tested positive for HPV (64% and 60%).

Similar Attitudes were reported about cervical cancer diagnosis. The majority of participants would feel "not at all" or "a little" vengeful, dirty, or deceived. And two-thirds (67%) indicated that they would feel "quite a bit/extremely" panicked if diagnosed with cervical cancer.

Table 4-3 Participants' Knowledge of HPV, Cervical Cancer, and Cervical Cancer Screening (n=159)

	% with correct answer
Knowledge about HPV	
Human Papillomavirus (HPV) is transmitted by skin-to-skin contact.	27
Multiple sexual partners increase one's risk for HPV infection.	91
The best way to prevent complications from HPV is to have regular Pap tests.	78
Pap tests will almost always detect HPV.	30
HPV is the virus that can cause cervical cancer.	75
Knowledge about cervical cancer	
Cervical cancer can be treated.	83
Cervical cancer is caused by a virus.	45
Having many sexual partners can increase the risk for cervical cancer.	73
Cervical cancer can be inherited from family members.	59
Knowledge about cervical cancer screening	
A Pap test should be conducted annually (every year).	95
A good indication to begin obtaining a Pap test is one's age.	62
A good indication to begin obtaining a Pap test is the initiation of sexual activity.	87
A Pap test is used to check for abnormalities on the cervix.	92
If a woman's Pap test is normal, she does not have HPV.	57

Relatively few participants reported negative feelings about having a Pap test. Of the seven items of interest, 22% reported anxiety within the "moderate" or "quite a bit/extremely" categories. Participants did not report being scared, guilty or dirty, with only 11%, 3% and 1% affirmative responses in these categories respectively. Table 4-4 summarizes the results.

Table 4-4 Participants' Attitudes about HPV, Cervical Cancer, and Cervical Cancer Screening (n=159)

	Not at all/ little %	Moderately %	Quite a bit/ extremely %
If you tested positive for HPV, how would you feel?			
Scared	11	34	64
Angry	29	37	34
Vengeful	72	22	7
Guilty	52	23	25
Anxious	14	26	60
Dirty	55	18	27
Deceived	50	21	29
If you were diagnosed with cervical cancer, how would you feel?			
Angry	31	28	41
Vengeful	82	11	7
Confused	27	36	37
Dirty	79	15	6
Regretful	44	22	34
Panicked	18	15	67
Deceived	79	15	6
How would you feel about having a Pap test?			
Scared	89	6	5
Angry	100	0	0
Vengeful	100	0	0
Dirty	99	1	0
Guilty	97	2	1
Anxious	79	11	11
Desperate	100	0	0

Table 4-5 Participants' Beliefs about HPV, Cervical Cancer, and Cervical Cancer Screening (n=159)

	Strongly disagree/ Disagree %	Neutral %	Agree/ Strongly agree %
HPV beliefs			
I believe any woman can get HPV.	8	13	79
I believe there is not much I can do to prevent HPV.	80	13	6
I believe I would be afraid to tell my partner if I had HPV.	55	17	28
Cervical cancer beliefs			
I believe any woman can get cervical cancer.	6	7	87
I believe I would be afraid to tell my partner if I had cervical cancer.	79	9	11
I believe, if found early, cervical cancer can be cured.	4	19	77
Cervical cancer screening beliefs			
I believe a woman should only have a Pap test if sexually active.	75	3	21
I believe a woman should only have Pap tests if she has symptoms.	94	0	6
I believe that Pap tests are often incorrect.	61	31	8

Participants' beliefs were also measured a Likert scale. Response options included "strongly disagree", "disagree", "neutral", "agree", and "strongly agree". Scores for the "strongly disagree" and "disagree" were combined, as were scores for "agree' and "strongly agree". The majority of participants believed that any woman can get HPV (79%). Additionally, the majority expressed a belief in their ability to reduce the risk for HPV and disclosure to a partner (80% and 55%, respectively). The majority of participants believed that cervical cancer could happen to anyone (87%) and, if detected early, could be cured (77%). Few participants expressed a concern about sharing a cervical cancer diagnosis with her partner (11%).

Most of the respondents disagreed or strongly disagreed that a woman should only have a Pap test if sexually active or experiencing symptoms (75 and 94%, respectively). Additionally, the majority of participants disagreed or strongly disagreed that Pap test are often incorrect (61%). See Table 4-5 for findings.

Reinforcing and Enabling Construct Responses

Table 4-6 summarizes participants' responses to items regarding the reinforcing and enabling constructs of interest in the study. Most women involved in the study reported having had a Pap test and normal results "ever" in their lives (92 and 68%, respectively. 31% indicated that they had at least one irregular or abnormal Pap test result in this time period. Most participants reported using a prescription contraception (61%) with 67% of respondents indicated that an annual visit with a healthcare provider was required for their contraceptive use. The majority of participants indicated that physical comfort was important to them during a Pap test (88%), and all participants indicated emotional comfort was important during a Pap test.

From the enabling constructs, almost all participants indicated that they had medical insurance and three-fourths had insurance that covered a Pap test (92 and 76%, respectively). Eighty percent of participants indicated a preference for a female reproductive health provider, and 76% were under the care of a female reproductive health provider. Seventy-seven percent of women participating indicated that they had obtained a Pap test within the past year.

Table4- 6 Participants' Responses to Reinforcing and Enabling Construct Items (n=159)

	% responding yes
Reinforcing Construct: Abnormal Pap test results	
I have had a Pap test.	92
All of my Pap tests have been normal.	68
I have had at least one irregular/abnormal Pap test result.	31
Reinforcing Construct: Use of a prescription contraception	
I use a prescription contraceptive/birth control.	61
My prescription contraception/birth control requires an annual visit with my healthcare provider.	67
Reinforcing Construct: Comfort level with the procedure	
It is important for me to be physically comfortable during a Pap test.	88
It is important for me to be emotionally comfortable during a Pap test.	100
Enabling Construct: Level of income	
See Table 4-2	
Enabling Construct: Cervical cancer screening insurance	
I have medical/health insurance.	92
I have medical/health insurance that covers a Pap test.	76
Enabling Construct: Female provider	
I prefer a female provider for reproductive/gynecological health services.	80
I have a female provider for reproductive/gynecological health services.	76
Outcome variable: Annual Pap test	
Have you had a Pap test within the past year?	77

Significance Test

Spearman Rank Correlation

Based upon the professional judgment of a supervisory committee member, significance testing was conducted to ascertain which constructs to include in the regression models. After summing the scores for the knowledge, attitude, and belief scales from the research instrument, the researcher conducted a relational test to ascertain which variables to include in the regression models. Spearman rank correlation was used to detect significant variables within a bivariate analysis. The Spearman rank correlation is a nonparametric test used to find correlations among ordinal data and provides the strength of association between the explanatory variable of interest to the outcome variable of interest. The statistic indicates a strength of association between –1 and 1. Significance was set a α=.05. To protect against familywise Type I error at α=.05, the Bonferroni adjustment was applied to each of the 15 models, resulting in a per analysis α_{pa} at .0033.

The 15 variables included in the Spearman correlation were as follows: predisposing variables: knowledge of HPV, knowledge of cervical cancer, knowledge of cervical cancer screening, attitudes about HPV, attitudes about cervical cancer, attitudes about cervical cancer screening, beliefs about HPV, beliefs about cervical cancer, and beliefs about cervical cancer screening. Reinforcing variables included were: previous abnormal Pap test results, use of a prescription contraception, and comfort level with the procedure. Finally, the

Enabling variables included were: level of income, cervical cancer screening insurance, and having a female provider. The outcome variable was whether the participant had obtained an annual Pap test, or not.

Spearman rank correlation indicated that four of the 15 variables were significantly associated with the outcome variable, annual Pap test. Of the variables in the Predisposing construct, attitudes and beliefs about cervical cancer screening were found to have a significant correlation with the outcome variable.

4-7.Spearman rho Correlation for PRECEDE Constructs

Variable	*f*	p value	*r*
Knowledge of HPV	157	.043	.161
Knowledge of cervical cancer	157	.149	.116
Knowledge of cervical cancer screening	156	.030	.174
Attitudes about HPV	156	.660	-.036
Attitudes about cervical cancer	154	.057	-.154
Attitudes about cervical cancer screening	153	.003*	-.234
Beliefs about HPV	155	.514	-.053
Beliefs about cervical cancer	155	.045	-.161
Beliefs about cervical cancer screening	157	.003*	-.238
Level of income	156	.407	.067
Cervical cancer screening insurance	151	.738	.027
Female provider	156	.003*	.238
Previous abnormal Pap test results	152	.577	.046
Use of a prescription contraception	142	.000*	.526
Comfort level with the procedure	154	.061	-.151

*Significant at the .0033 level

Both had negative associations, indicating that participants with lower scores for these constructs were more likely to have annual Pap tests. As stated by Green and Kreuter, there are two key concepts associated with the construct of attitude. They are: "(1) Attitude is a rather *constant* feeling that is *directed toward an object* (be it a person, an action, a situation, or an idea); and, (2) inherent in the structure of an attitude is *evaluation*, a good-bad dimension," (p. 158).

The Likert scales that measured the participants' attitudes toward Pap test were created so that a lower score indicated a more positive attitude toward Pap test. A higher score suggested a more negative association with the Pap test. As provided in Table 4.3, the variable "Attitudes about cervical cancer screening" p = .0033 and r = -.234. Thus, the negative correlation indicates an inverse relationship for attitudes to Pap test and an annual Pap test. A belief is defined by Green and Kreuter (1991) as "a conviction that a phenomenon or object is true or real" (p. 156). Compiled scores for the scale that measured participants' beliefs about the Pap test were reverse-coded. Results suggest that the stronger a participant's conviction in the efficacy of a Pap test, the more likely she was to have an annual Pap test.

One reinforcing construct, the use of a prescription contraception, was significant with p=.000 and r=.526 as was one enabling construct, having a female provider, p=.003 and r=.238. Both variables have a positive relationship with the outcome variable.

Table 4-8. Spearman rho Correlation of Significant Variables

Variable	p value	*r*
Attitudes about cervical cancer screening	.003	-.234
Beliefs about cervical cancer screening	.003	-.238
Use of a prescription contraception	.000	.526
Having a female provider	.003	.238

Research Question Results

Based on the findings from the significance tests, three logistic regression models were run to address research questions. A logistic regression model is the most parsimonious model for the first three research questions. A logistic regression model can be used when the researcher wants to describe the relationship between one or more independent variables and a dichotomous outcome variable; for this research, whether the participant had engaged in cervical cancer screening behavior (Pap test) within the past year.

Research question 1: What predisposing factors are associated with college women's cervical cancer screening behavior?

A multiple logistic regression analysis was conducted to test for the significance of predisposing factors and college women's cervical cancer screening behavior. As a result of the significance testing, attitudes about cervical cancer screening and beliefs about cervical cancer screening were included in the regression model. Results indicated that attitudes about cervical cancer screening" was statistically significant, (p=.007; B=1.27). A logistic regression coefficient can be interpreted as the odds increase by e^{β} for unit increase in X. If the odds ratio is 1, then there is a 50/50 chance the event will occur. That is, if the odds ratio is greater than one, the event is more likely to occur; if the odds ratio is less than one, the event is less likely to occur. That is, for each incremental increase in use of prescription contraception, there is a 1.27 increase in annual Pap test compliance. Table 4-9 summarizes the results of this regression model.

Table 4-9. Multiple Logistic Regression Analysis of Predisposing Factors and Annual Cervical Cancer Screening

Variable	*b*	*SE*	*Wald*	*p*-value	*Exp(B)*
Attitudes about cervical cancer screening	.237	.087	7.342	.007*	1.27
Beliefs about cervical cancer screening	-.164	.102	2.604	.107	.849

* Significant at the .05 level

Research question 2: What reinforcing factors are associated with college women's cervical cancer screening behavior?

A logistic regression analysis was conducted to test for the significance of reinforcing factors and college women's cervical cancer screening behaviors. As a result of the significance testing, use of a prescription contraception was included in the regression model. Table 4-8 shows that using a prescription contraception was significant (p=.000; B=4.881). The regression coefficient can be interpreted in terms of rates of change. That is, for each incremental increase in use of prescription contraception, there is a 4.881 point increase in annual Pap test compliance. Results are summarized in Table 4-10.

Table 4-10. Multiple Logistic Regression Analysis of Reinforcing Factors and Annual Cervical Cancer Screening

Variable	*b*	*SE*	*Wald*	*p*-value	*Exp(B)*
Prescription contraception	1.559	.297	27.509	.000*	4.881

* Significant at the .05 level

Research question 3: What enabling factors are associated with college women's cervical cancer screening behavior?

A third logistic regression analysis was conducted to test for the significance of enabling factors and college women's cervical cancer screening behaviors. One variable was used in the equation, having or preferring a female provider for a Pap test. This variable was statistically significant (p=.007; B=1.889). The regression coefficient can be interpreted in terms of rate of change. That is, for each incremental increase in having or preferring a female provider, there is a 1.889 point increase in annual Pap test compliance. Table 4-11 summarizes the results for the logistic regression.

Table 4-11. Multiple Logistic Regression Analysis of Enabling Factors and Annual Cervical Cancer Screening

Variable	*b*	*SE*	*Wald*	*p*-value	*Exp(B)*
Female provider	.636	.237	7.228	.007*	1.889

* Significant at the .05 level

Research question 4: Was age associated with college women's cervical cancer screening behavior?

To determine any association between a participant's age and cervical cancer screening behavior, an Independent Sample T-test was conducted. The purpose of the T-test was to determine if there was a difference between the means of the population of interest (Shavelson, 1996). The results of the analysis indicate that age was not statistically significant (p=.803) as shown in Table 4-12.

Table 4-12. Independent Samples T-test Analysis of Age and Annual Cervical Cancer Screening Behavior

Variable	*t*	*df*	*Sig (2-tailed)*
Age	.034	154	.803

* Significant at the .05 level

Research question 5: Was ethnicity associated with college women's cervical cancer screening behavior?

According to Tuckman (1999) a Chi-Square test should be used when analyzing one or more nominal variables. This test indicates whether one's race or ethnicity has significantly different distributions across the decision to have (or not have) an annual Pap test. The probability of error was set at .05. With four degrees of freedom, the appropriate critical value of was established at 9.487 (Shavelson, 1996). As χ^2_{observed} (6.811) is lower than χ^2_{critical} (9.487), ethnicity/race was not statistically significant.

Table 4-13. Chi-Square Analysis of Ethnicity and Annual Cervical Cancer Screening Behavior

Variable	*f*	χ^2	*Sig (2-tailed)*
Race/Ethnicity	158	6.811	.146

* Significant at the .05 level

Summary

This chapter proved descriptive data for the research sample, findings from initial significance tests as well as results for each of the five research questions. The sample was fairly representative of female students enrolled at the University of Florida. There was an overrepresentation of Caucasian women and graduate students. The majority of participants were single (73.6%) and had an annual income below $20,000 (75.6%). The majority of these participants (73.1%) identified as religious.

Findings from preliminary statistical analyses suggest that, of the initial 15 constructs identified through the PRECEDE Model, three were associated with the participants' behavior to obtain an annual Pap test. Participants' beliefs about cervical cancer screening, having a prescription contraception, and having and/or preferring a female provider. An Independent Samples T-test found that one's age was not associated with a woman's having an annual Pap test, nor did a Chi square test find significance of association between ethnicity/race and the outcome variable.

CHAPTER 5
SUMMARY, DISCUSSION, CONCLUSIONS, AND IMPLICATIONS FOR FUTURE RESEARCH

This research was conducted to determine what constructs derived from the PRECEDE Model were significantly related to college women's behavior regarding cervical cancer screening. This study was unique in that it sought to assess collective causation for women's compliance to cervical cancer screening. Numerous studies have been conducted examining the relationship between compliance and variables pertinent to predisposing, reinforcing or enabling constructs, but not all three. To examine health behavior it is essential to consider a multitude of variables, as most behaviors are the result of many influences. This chapter summarizes the study, discusses the key findings, and offers conclusions and implications for future research.

Summary

The purpose of this study was to utilize a diagnostic health promotion framework, the PRECEDE Model, to assess variables associated with women's compliance with Pap test guidelines. Using the educational and organizational diagnosis from the framework of the PRECEDE model, 15 constructs were identified as the predisposing, reinforcing and enabling factors that contribute most significantly to the target behavior of interest, specifically a college woman's obtaining an annual Pap test.

The predisposing constructs were identified as: knowledge of HPV; knowledge of cervical cancer; knowledge of cervical cancer screening; attitudes about HPV; attitudes about cervical cancer; attitudes about cervical cancer screening; beliefs about HPV; beliefs about cervical cancer; and, beliefs about cervical cancer screening. The reinforcing constructs were identified as: level of income; cervical cancer screening insurance; and having a female provider. The enabling constructs were previous abnormal Pap test results; use of a prescription contraception; and one's comfort level with the procedure. Additionally, participants' age and race/ethnicity were included as explanatory variables to assess any relationship to the outcome variable.

Participants in this study were 400 randomly selected women from among all full-time enrolled women at the University of Florida during the Fall 2002 term. The UF population during this period consisted of 24,000 women, including undergraduate, graduate and professional students.

The instrument for data collection was developed utilizing three existing questionnaires with varying degrees of reliability and validity, and was supplemented by items developed by the researcher. To improve the validity of the research findings, an expert panel was convened to address the content. Based upon their recommendations, modifications were made to the instrument. The use of a true random sample also increased the validity of the findings, making them more generalizable to other populations (Alreck & Settle, 1995).

Two pilot tests were conducted to assess and improve the reliability of the instrument. The first pilot test was conducted with female volunteers from an introductory health course. The second pilot test, administered via the web, assessed reliability as well as the efficacy of the on-line instrument; this allowed for any modification necessary for web-based data collection.

The reliability of the final instrument was determined utilizing Cronbach's alpha score for the scales with data collected from the two pilot tests. The scales averaged .75 with a minimum of three items. The instrument consisted of 66 items that solicited information about the 17 explanatory variables based on the PRECEDE model as well as demographic characteristics.

Data were collected using Dillman's Total Design Method, (2000) which included a pre-notification email followed by an email with the consent link. Upon consent, the link automatically took participants to the questionnaire. Three additional requests for participation were emailed to the sample (n = 400). The final response rate was 40%, with 159 respondents. Data were read electronically as html tables, copied and pasted into Excel, and finally transferred into SPSS. Descriptive and inferential statistics were used to analyze the data. Multiple logistic regression analysis was used to address each of the first three research questions.

Strengths and Limitations

The goal of this study was to determine what factors influence college women's decisions to obtain annual cervical cancer screening. One strength of this study was the use of the PRECEDE Model to search for multiple causation to an association with the outcome variable. This model has been used successfully for several other health issues that centered around the importance of early detection (breast self exam and mammography, for example). However, there was no research that indicated that this model, one that acknowledges that health and health risks have multiple factors, had been used to assess reasons for cervical cancer screening compliance. Prior to this study, expansive data collection was limited and questions remained about why women did or did not comply with cervical cancer screening guidelines recommended for their age and/or behavior. This research examined conventional measures of behavior (knowledge), as well as the participants' attitudes and beliefs, the impact of social systems, and feedback from previous experiences.

Another aspect of the PRECEDE model that makes it useful in the social sciences is its implementation component. This model sets ups parameters for a diagnosis of the health issue, then provides a framework for an effective intervention utilizing a multitude of venues and includes evaluation as an integral component of the overall model structure.

Random sampling was also a strength of this study. The use of a random sample allows the opportunity for each woman from the UF population to be selected as part of the sample; this, in turn, allows the results from the sample to be generalized to the population.

One potential weakness of this research project was its relatively low response rate. The researcher originally sought a goal response rate of 50%. Ultimately, the response rate was deemed acceptable at 40%. The lower response rate may be explained by the use of a population pool from 2002. While the research was conducted in Fall 2003, the most comprehensive enrollment list for the university was from Fall 2002. Several emails were returned as "undeliverable", and others were returned with an indication that they were no longer enrolled at the university or were no longer full-time students. Additionally, while all UF students are required to have an email account through the university, this does not eliminate the possibility that some students do not access these accounts or the account has function problems (i.e., the account is full or being forwarded to another account that reads certain emails as "junk mail"). Another consideration about the response rate may be the content of the questionnaire, deemed sensitive by many. A review of existing research showed response rates from other research as low as 3%.

Another possible limitation of this study is the representation of the participants. White participants were over-represented, while all other races/ethnicities were under-represented. Also, women over the age of 26 were disproportionately represented in this study.

Discussion of Results

What predisposing factors are associated with college women's cervical cancer screening behavior?

After conducting a preliminary significance test (Spearman rho correlation), two of the nine Predisposing constructs were included in the multiple logistic regression model, attitudes about cervical cancer screening and beliefs about cervical cancer screening. Attitudes about cervical cancer screening was found to have a significant association with college women's cervical cancer screening behavior, while the second construct, beliefs about cervical cancer screening, was not significant. These findings suggest that the more positively a college woman perceives or evaluates the Pap test (as “good” rather than "bad”), the more likely she is to engage in regularly scheduled cervical cancer screenings.

Few other studies have examined the role of attitude or belief as it influences behavior regarding the Pap test. The finding from this study supports those reported by Ramirez et al. (1997) that indicated that a greater negative emotion score was associated with refusing HPV testing. Likewise, in this research study the seven items that comprised the attitudes about cervical cancer screening scale (originated from the Ramirez questionnaire) resulted in a negative association with screening behavior. Thus, participants with lower scores (indicating a more positive attitude about cervical cancer screening) were more likely to have annual Pap tests.

The study by Hubbell and colleagues (1996) also found attitude to be significant for this behavior among Latina women. Ultimately, the stronger the negative feelings of Latina women (especially foreign-born), the less likely they were to engage in cervical cancer screening.

What reinforcing factors are associated with college women’s cervical cancer screening behavior?

This investigation found that the use of a prescription contraception had the greatest association with annual Pap test compliance. Thus, women who are using prescription types of contraception are more likely to comply with guidelines for annual Pap exams. An increase in use of a prescription contraception resulted in an increase in annual Pap test compliance. This finding concurs with Eaker, Adami and Sparen's (2001) study of Swedish women in that women with non-prescription contraception were less likely to attend cervical cancer screenings. The researchers suggested a "carry over" effect as well. Women who engage in regular screenings as a result of prescription contraception use were more likely to continue this behavior as they got older.

What enabling factors are associated with college women's cervical cancer screening behavior?

Of the three explanatory variables assessed for significance from the Enabling construct only having (or preferring) a female provider was found to be significant. Brody, Kohler and Rask's (2000) research similarly found that not only were women more likely to have an annual Pap test if they had a female provider, but they also were more likely to have other recommended screening, such as mammogram and diabetes screening. A study by Nguyen et al. (2002) examined intent to have a Pap test as well as Pap test receipt among Vietnamese-American women. A female provider (or a female standby if the provider were male) was significantly associated with both intent and receipt among this sample.

Was age associated with college women's cervical cancer screening behavior?

No association was found between age and cervical cancer screening behavior. Some of the existing research on general populations suggests that older women are less likely to engage in cervical cancer screening, but no research indicated that this was the case for older college-enrolled women.

Was ethnicity associated with college women's cervical cancer screening behavior?

Ethnicity was not found to have an association with annual cervical cancer screening behaviors. Traditionally, minority and foreign-born women report lower rates of cervical cancer screening behavior overall, but this finding may not apply to a college population. Additionally, African American women were designated as a group to be "high-risk" for breast and cervical cancers. As a result, targeted interventions became widespread throughout this population. To date, African American women report higher screening rates than any other race or ethnicity in the United States.

Conclusions and Recommendations

Three variables were found to be significant at the .05 level. These were using a prescription contraception, having or preferring a female provider, and a positive attitude about Pap testing. Neither the age nor race of participants were found to be significant.

Based on these findings, some proposed improvements for women's healthcare, in general, emerge. First, reproductive health professionals should consider the implication of reducing the need for Pap testing among certain populations. Additionally, similar to other research in this area, this study supports the call for consumer and provider education. Finally, these findings suggest the need for tailoring obstetrics and gynecology practices to the consumer.

The first recommendation is reconsideration by the USPSTF of modifying Pap test guidelines (delaying first test until 21) and eliminating the need for a Pap test and pelvic exam for prescription contraception. The provision for Pap test and pelvic exam, an almost universal requirement for contraception in the United States, is a recent debate by healthcare professionals, suggesting that the practice is outdated and the risks outweigh the benefits (Kaiser Family Foundation, 2001). At least one state, Washington, has begun to allow some women to purchase contraception without a prescription.

This requirement is often viewed as a barrier to contraceptive use, thus increasing the likelihood of unplanned pregnancies. Some European countries have eliminated this barrier and see lower rates of unintended pregnancy than the US. However, as the results of this investigation indicate, the association between obtaining a prescriptive contraceptive and having a Pap test was the strongest relationship. Thus, the result of a policy change whereby obtaining a Pap test and a pelvic exam are no longer required to obtain prescription contraception might be an increase in cervical cancer. As indicated by the literature, young women are the population at greatest risk for HPV exposure and infection. The typical prevalence for HPV infection for women under 25 is between 28 and 46 percent (Burk et al., 1996). While most HPV infections resolve spontaneously, early detection of cervical dysplasia—through a Pap test—is the ideal means for best resolution (i.e., lower costs and longer survival rates).

Often health education efforts put knowledge at the forefront of objectives for success. As these findings suggest, knowledge is not equivocal to behavior. Educators need to find mechanisms to address cultural and social implications regarding the attitudes and beliefs specific to the behavior of interest. Furthermore, education efforts should address not only the consumer of healthcare, but providers as well. The Sexuality Education and Information Council of the United States advocates this thought within the context of a position statement:

> Professional training in all health care fields, at entry and continuing education levels, should include education about sexual health concerns, needs, and therapies. (SIECUS, 2004)

Also, this recommendation was echoed by a respondent's email, unsolicited, that this researcher received after the respondents were notified that they would receive a questionnaire for this study:

> You're doing a great thing. I have HVP and did not find out until I was pregnant with my daughter at age 24. I had no idea and I did get regular pap smears. My husband at the time was furious. He wanted to know if I was cheating on him. Who knows when I had got it, I had been with him for 4 years prior to becoming pregnant. He never trusted me after. Well the story goes on, I now go for testing every 3mo and no my insurance only pays to have my annual. I have had biopsies, an acid wash to cleanse my cervix and a dreadful feeling every time I go for my pap smear. The two weeks waiting for the results from the lab is awful and think I have to go through it 4 times a year. I just had a new test that tells the strain of the virus to see if I should continue every three mo or what? I never knew anything about the virus. Now I do. It's a great thing for you to educate others. It is about time and well needed.

For health educators, there are numerous implications for this recommendation. To appropriately address the needs of the audience information must be culturally sensitive and suitable, and targeted. Needs assessments can assist in meeting these objectives. Also, the health educator and provider should empower the consumer by engaging in skill development, including accessing appropriate information and services.

Finally, these research findings suggest that there needs to be improvement among provider care. If many women prefer a female provider and having a female provider increases women's compliance with Pap test recommendations, as these findings suggest, then perhaps managed care organizations should increase the consumers' access to such care. According to an excerpt of the position statement from the Association of Reproductive Health Care Providers entitled "Improving Health Care Access and Patient Care Through Collaborative Practice,"

> Physician-only laws -- many of which were created prior to the emergence of nurse practitioners and physician assistants --often impose unnecessary legal barriers to quality health care.
>
> ARHP supports prescriptive authority and equitable reimbursement for all trained and qualified health care providers-such as physician assistants, nurse practitioners, nurse midwives, and pharmacists-within their practice specialty. The ability of these individuals to prescribe controlled drugs is essential to providing cost-effective, quality health care. All clinicians must be guided by their training, experience, and standards of care that reflect the most current research, technology, and clinical guidelines (Association of Reproductive Health Care Providers, 2003).

Perhaps by considering these recommendations, managed care companies could expand their provider lists, allowing for a greater variety of options to consumers, while increasing the number of available female providers for women's reproductive health services. Additionally, the field should promote a movement from a medical model to a social model for the treatment of women.

Changing the current paradigm means understanding many of the inaccurate or outdated ideas about women and health (Andrist, 1997; Klima, 1993). The idea of "fusion" between feminist theory and care seems to be the prevailing philosophy.

This ideology embraces three emerging goals in women's health care. First, providers at all levels should intentionally engage in research and provider education that has feminist foundations. Second, there should be a movement to change the power differential between the provider and the patient. The final goal for an improved model for women's healthcare is to change the dated medical model and ascribe to a model that is woman-oriented.

Implications for Future Research

The majority of available research was limited in the search for association to knowledge scales and dichotomous response options. To ascertain the multitude of potential influential variables, the research can be lengthy and the appropriate population difficult to access. Moreover, research that contains items about sensitive topics may be even more challenging.

In accordance to the feminist approach to research, including a qualitative component to this type of research could prove beneficial. Including focus groups or interviews as elements of research might not only strengthen the findings (through triangulation of evidence), but might prove useful in supporting the quantitative findings regarding attitudes and beliefs—scales that are challenging to create.

As to the issue of sensitive topics, anonymity seems to be an important feature for researchers to bear in mind. Consider this unsolicited email received during the course of this research:

> I am unable to work with you on this project. I am currently self-insured and paying extremely high premiums. At this time the need for confidentiality is most important to me. I wish you success.

This communication implies that sharing information may result in some harm to the participant. Ultimately, to obtain data that is most representative, researchers must strive for rigor but maintain empathy for those they wish to serve.

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APPENDIX A
UNIVERSITY OF FLORIDA INSTITUTIONAL REVIEW BOARD APPLICATION

1. TITLE OF PROTOCOL:

Application of the PRECEDE Model to Assess Cervical Cancer Screening Behaviors Among University of Florida College Women

2. PRINCIPAL INVESTIGATOR(s):

Terri Mitchell, PhD Candidate
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4. DATES OF PROPOSED PROTOCOL: From: May 2003 To: December 2003

5. SOURCE OF FUNDING FOR THE PROTOCOL:

Terri Mitchell, Researcher

6. SCIENTIFIC PURPOSE OF THE INVESTIGATION:

The purpose of this study is to identify the predisposing, reinforcing and enabling factors associated with college women's compliance with cervical cancer screening behaviors. Cervical cancer has been found to be a possible outcome of human papillomavirus (HPV) infection. Federal health agencies and researchers in the United States recognize the significance of the incidence of HPV infection among young women. College-aged women are cited as those at greatest risk, specifically women 25 or younger. Collecting data with the PRECEDE Model will enable health professionals to establish priorities for appropriate interventions and education to prevent cervical cancer.

7. DESCRIBE THE RESEARCH METHODOLOGY IN NON-TECHNICAL LANGUAGE.

A random sample of all women over 18 registered at the University of Florida as full-time students during the Fall 2002 term will be surveyed. The survey, developed by the researcher, is adapted from other published surveys found through the literature review. Two pilot studies will establish reliability using 20 volunteer students enrolled in a Summer A 2003 class. An expert panel will establish content validity. The second pilot study will be conducted via email to assess the methodology, including the questionnaire completions being stored automatically in an existing database. These 20 participants will be sent an email with a cover letter and a link to the questionnaire web address. Results of the pilot study will undergo statistical analyses for reliability coefficients.

Four hundred participants selected at random using the UF Registrar list of Gatorlink accounts for the final study will be sent an email with a cover letter and link to the web address. Three days after the initial e-mailing, a reminder email will be sent to all participants. At three-day intervals, two additional reminder emails will be sent to non-respondents. Participation is voluntary and participants will remain confidential. Participants will be asked for their name and mailing address to receive an incentive for participating.

8. POTENTIAL BENEFITS AND ANTICIPATED RISK.

Participants will be given a token of appreciation for their participation (a 60-minute long distance phone card). Participants will be offered a copy of the results if they would like. There is no anticipated risk for the participants.

9. DESCRIBE HOW PARTICIPANT(S) WILL BE RECRUITED, THE NUMBER AND AGE OF THE PARTICIPANTS, AND PROPOSED COMPENSATION (if any):

Participants will be recruited through obtaining a randomized list of University of Florida female students enrolled as full-time students Fall 2002 term. The randomized list will include the student's Gatorlink account for a web-based dissemination of solicitation for participation. Four hundred participants will be invited to participate in the actual study. Final data collection will be conducted via a web-based method. The researcher will request that only participants over 18 complete the questionnaire.

Compensation will include a long distance phone card (60 minutes) and access to the completed study.

10. DESCRIBE THE INFORMED CONSENT PROCESS. INCLUDE A COPY OF THE INFORMED CONSENT DOCUMENT (if applicable).

The participants will participate on a voluntary basis, with a nominal incentive for participation. They will be sent a cover letter (see attached) explaining the project and asking for their participation and cooperation.

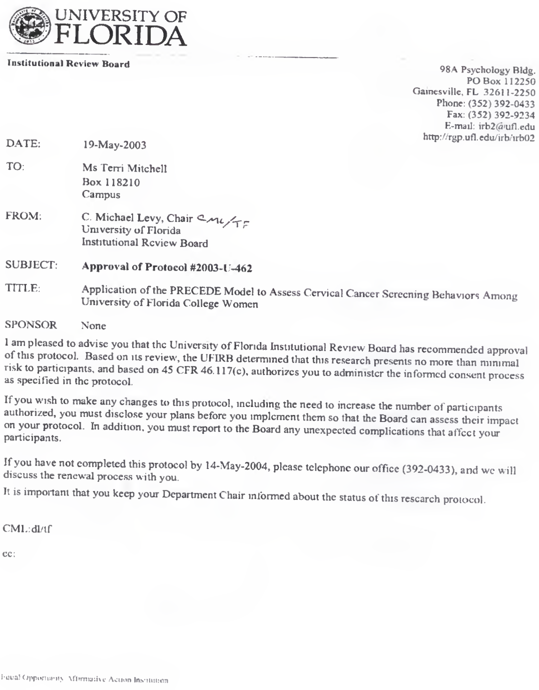
____
Principal Investigator's Signature

____
Supervisor's Signature

I approve this protocol for submission to the UFIRB:

____
Dept. Chair/Center Director Date

APPENDIX B
INSTITUTIONAL REVIEW BOARD APPROVAL



UNIVERSITY OF
FLORIDA

Institutional Review Board

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DATE: 19-May-2003

TO: Ms Terri Mitchell
Box 118210
Campus

FROM: C. Michael Levy, Chair CML/TF
University of Florida
Institutional Review Board

SUBJECT: **Approval of Protocol #2003-U-462**

TITLE: Application of the PRECEDE Model to Assess Cervical Cancer Screening Behaviors Among University of Florida College Women

SPONSOR None

I am pleased to advise you that the University of Florida Institutional Review Board has recommended approval of this protocol. Based on its review, the UFIRB determined that this research presents no more than minimal risk to participants, and based on 45 CFR 46.117(c), authorizes you to administer the informed consent process as specified in the protocol.

If you wish to make any changes to this protocol, including the need to increase the number of participants authorized, you must disclose your plans before you implement them so that the Board can assess their impact on your protocol. In addition, you must report to the Board any unexpected complications that affect your participants.

If you have not completed this protocol by 14-May-2004, please telephone our office (392-0433), and we will discuss the renewal process with you.

It is important that you keep your Department Chair informed about the status of this research protocol.

CML:dl/tf

cc:

Equal Opportunity/Affirmative Action Institution

APPENDIX C
ORIGINAL QUESTIONNAIRE

University of Florida Women's Reproductive Health Questionnaire

I. Demographics:

Instruction: Please describe yourself by selecting the BEST response for each question. Please fill in the bubble where appropriate.

1. What is your age? _____

2. Which of the following best describes your race/ethnicity?
☐ White
☐ Hispanic/Latino
☐ Black/African American
☐ Asian/Pacific Islander
☐ American Indian
☐ Other (please specify: _______________)

3. What is your personal income?
☐ $0 -- $9,999 per year
☐ $10,000 - $19,000 per year
☐ $20,000 -- $29,000 per year
☐ $30,000 -- $49,000 per year
☐ $50,000 or more per year

4. What is your marital status?
☐ Single
☐ Married
☐ Separated/Divorced
☐ Widowed

5. If you are not currently married, do you live with a partner (boyfriend, girlfriend)?
☐ Yes
☐ No

6. Which of the following best describes your religion?
☐ Catholic
☐ Protestant
☐ Buddhist
☐ Muslim
☐ Jewish
☐ Mormon
☐ Jehovah Witness
☐ Other (please specify) _________________
☐ I do not consider myself to be religious.

Turn over page

7. What is your most recent (current) college major? ____________________

8. Which of the following best describes you currently or your most recent student status:
☐ Undergraduate student
☐ Graduate student
☐ Professional student

II. Please answer some questions about your knowledge of Human papillomavirus.

Instruction: Choose the **best** response by clearly circling **True, False**, or **Not Sure**.

9. HPV is transmitted by skin-to-skin contact.	**True**	**False**	**Not Sure**
10. Multiple sexual partners increase one's risk for HPV infection.	**True**	**False**	**Not Sure**
11. The best way to prevent complications from HPV is a Pap test.	**True**	**False**	**Not Sure**
12. If a woman's pap smear is normal she doesn't have HPV.	**True**	**False**	**Not Sure**
13. The best way to prevent complications from HPV is to have regular Pap tests.	**True**	**False**	**Not Sure**
14. Pap smears will almost always detect HPV.	**True**	**False**	**Not Sure**
15. HPV is the virus that can cause cervical cancer.	**True**	**False**	**Not Sure**
16. Genital warts are caused by HPV.	**True**	**False**	**Not Sure**
17. A condom can decrease the risk for HPV infection.	**True**	**False**	**Not Sure**

III. Please answer some questions about your knowledge of cervical cancer.

Instruction: Choose the **best** response by clearly circling **True, False**, or **Not Sure**.

18. Cervical cancer can be treated.	**True**	**False**	**Not Sure**
19. Cervical cancer can reoccur.	**True**	**False**	**Not Sure**
20. Cervical cancer can be fatal.	**True**	**False**	**Not Sure**
21. If detected early, cervical cancer has greater success in treatment.	**True**	**False**	**Not Sure**
22. Cervical cancer can be inherited from family members.	**True**	**False**	**Not Sure**
23. Cervical cancer is caused by a virus.	**True**	**False**	**Not Sure**
24. Sexual activity at an early age can increase the risk for cervical cancer.	**True**	**False**	**Not Sure**

25. Having a mother who has had cervical cancer can increase the risk for cervical cancer.	**True**	**False**	**Not Sure**
26. Having many sexual partners can increase the risk for cervical cancer.	**True**	**False**	**Not Sure**

IV. Please answer some questions about your knowledge of the Pap test.

Instruction: Choose the **best** response by clearly circling **True, False**, or **Not Sure**.

27. A Pap test should be conducted annually (every year).	**True**	**False**	**Not Sure**
28. A good indication to begin obtaining a Pap test is one's age.	**True**	**False**	**Not Sure**
29. A good indication to begin obtaining a Pap test is the initiation of sexual activity.	**True**	**False**	**Not Sure**
30. A Pap test is used to check for abnormalities on the cervix.	**True**	**False**	**Not Sure**
31. If a woman's Pap test is normal, she doesn't have HPV.	**True**	**False**	**Not Sure**
32. Changes in a Pap test may indicate that a woman has HPV.	**True**	**False**	**Not Sure**
33. A Pap test will almost always detect HPV.	**True**	**False**	**Not Sure**

V. This section will ask about your attitudes and feeling towards HPV.

Instruction: Please indicate your response by clearly **circling** the best response for each item (ie, scared, angry…).

Question: *If you tested positive for HPV, how would you **feel**?*					
34. Scared	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
35. Angry	**Not at all**	**A little**	*Moderately*	**Quite a bit**	**Extremely**
36. Vengeful	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
37. Guilty	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
38. Anxious	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
39. Confused	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
40. Dirty	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
41. Regretful	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
42. Deceived	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**

VI. This section will ask about your attitudes and feelings about cervical cancer:

Instruction: Please indicate your response by clearly **circling** the best response for each item (ie, scared, angry…).

Question: *If you were diagnosed with cervical cancer, how would you **feel**?*					
43. Scared	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
44. Angry	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
45. Vengeful	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
46. Anxious	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
47. Confused	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
48. Dirty	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
49. Regretful	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
50. Panicked	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
51. Deceived	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**

VII. This section will ask about your attitudes and feelings about cervical cancer screening (Pap test).

Instruction: Please indicate your response to the question by clearly **circling** the best response for each item (ie, scared, angry…).

Question: How would you **feel** about having a Pap test?					
52. Scared	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
53. Angry	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
54. Vengeful	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
55. Guilty	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
56. Relaxed	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
57. Anxious	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
58. Desperate	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**
59. Dirty	**Not at all**	**A little**	**Moderately**	**Quite a bit**	**Extremely**

VIII. This section will ask about your beliefs about HPV.

Instruction: Indicate how much you Agree or Disagree with each of the following statements about Human papillomavirus. Please clearly **circle** the best response.

60. Any woman can get HPV.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
61. I am more likely to get HPV than women of other ethnic groups.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
62. I am more likely to get HPV than older women.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
63. There is not much I can do to prevent HPV.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
64. I would be afraid to tell my partner if I had HPV.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
65. A woman can have HPV but have no symptoms.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
66. I think I would rather not know if I had HPV.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
67. HPV is treatable.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
68. A woman can reduce her risk for HPV.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
69. A woman is at greater risk for HPV if she does not have a regular partner.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**

IX. This section will ask about your beliefs about cervical cancer.

Instruction: Indicate how much you Agree or Disagree with each of the following statements about cervical cancer. Please clearly **circle** the best response.

70. Any woman can get cervical cancer.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
71. A woman can have cervical cancer but have no symptoms.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
72. I would be afraid to tell my partner if I had cervical cancer.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
73. If found early, cervical cancer can be cured.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
74. At my age, I don't need to worry about cervical cancer.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
75. There is not much I can do to prevent cervical cancer.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**

X. This section will ask about your beliefs about cervical cancer screening.

Instruction: Indicate how much you Agree or Disagree with each of the following statements about cervical cancer. Please clearly **circle** the best response.

76. Women should only have a Pap test if sexually active.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
77. Women should only have Pap tests if they have symptoms.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
78. Pap test results are often incorrect.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
79. A Pap test might save a woman's life.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
80. Pap tests are not necessary for older women.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
81. Pap tests are painful.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
82. Pap tests are necessary.	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**

XI. This section will ask about your care preferences and insurance status.

Instruction: Please respond to the following statements by clearly **circling** the best response.

For this study, a provider is one who performs a Pap test and pelvic exam (physician, nurse practitioner, physician's assistant, etc).			
83. I prefer a female provider for reproductive/gynecological health services.	**Yes**	**No**	**Not Sure**
84. I have a female provider for reproductive/gynecological health services.	**Yes**	**No**	**Not Sure**

For this study, health insurance may include private insurance, school insurance, Medicaid, etc.			
85. I have medical/health insurance.	**Yes**	**No**	**Not Sure**
86. I have medical/health insurance that covers a Pap test.	**Yes**	**No**	**Not Sure**

XII. This section will ask about your contraceptive use, Pap test experience and comfort level with a Pap test.

Instruction: Please answer the following questions by circling the best response.

87. I use a prescription contraceptive/birth control (such as oral contraceptives, Depo-Provera, Lunelle, OrthoEvra, NuvaRing, IUD).	**Yes**	**No**	**Not Sure**
88. My prescription contraception/birth control requires annual visit with my healthcare provider.	**Yes**	**No**	**Not Sure**

89. I have never had a Pap test.	**Yes**	**No**	**Not Sure**
90. All of my Pap tests have been normal.	**Yes**	**No**	**Not Sure**
91. I have had at least one irregular/abnormal Pap test result.	**Yes**	**No**	**Not Sure**
92. It is important for me to be physically comfortable during a Pap test.	**Yes**	**No**	**Not Sure**
93. It is important for me to be emotionally comfortable during a Pap test.	**Yes**	**No**	**Not Sure**

XIII. This section will ask about to your cervical cancer screening behavior and source of information about the Pap test.

94. Have you had a Pap test within the past year? Please clearly mark the best response.
☐ Yes
☐ No
☐ Not Sure

95. What are your sources of information regarding the Pap test? (mark all that apply)
☐ Mother
☐ Other female relative
☐ Physician or other medical care provider
☐ Friend
☐ Class
☐ Brochure/Pamphlet
☐ Other media (television, radio, etc.)
☐ Other (specify):_________

Thank you for your assistance!!

APPENDIX D
EXPERT REVIEW PANEL MEMBERS

Dr. Elissa Howard
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University of Florida
230 SHCC
Gainesville, Florida 32611

APPENDIX E
EXPERT PANEL INSTRUMENT ASSESSMENT INSTRUCTIONS

Content Expert Review: "Reproductive Health Questionnaire"

Thank you for agreeing to review the reproductive health instrument I wish to use for my study of college women's cervical cancer screening behavior. The items for each scale are intended to elicit information related to each of the factors influencing behavior based on the PRECEDE Model. Please assess the relevance and representativeness of the items for each scale.

I am also asking you to identify the "strongest" items in each scale since I need to limit the number of items per scale.

Thus, For each section, I ask you to please do three things:

1) **indicate the item relevance (low, medium, or high) by placing a check mark in the appropriate column;**
2) **identify the best items for that section; and,**
3) **if appropriate, suggest new items.**

Feel free to make edits, comments, and suggestions anywhere on the survey. Use the back of the page for additional space.

Please return your feedback to me by May 9th. Send or deliver to:

Department of Health Science Education
P.O. Box 118210, Room 5, FLG
Gainesville, 32611-8210 or email to mitchelt@ufl.edu.

If you have any questions, please email me at mitchelt@ufl.edu or call 352-392-0583, 1409. Dr. Barbara Rienzo is my Supervisory Committee Chair and she may be reached at brienzo@hhp.ufl.edu.

Thank you very much for your service as an expert panelist for my study.

Sincerely,

Terri Mitchell
Graduate Student
Department of Health Science Education
University of Florida

APPENDIX F
EXPERT PANEL FEEDBACK

University of Florida Women's Reproductive Health Questionnaire

Expert Panel:

Feedback Is welcome on this page, however scales and items begin on the next page.

I. Demographics:

Please describe yourself by selecting the BEST response for each question:

What is your age? _____

Which of the following best describes your race/ethnicity? Please choose the best response.
- o White
- o Hispanic
- o Black
- o Asian/Pacific Islander
- o American Indian
- o Other (please type in:______________)

What is your personal income?
- o $0 -- $9,999 per year
- o $10,000 - $19,000 per year
- o $20,000 -- $29,000 per year
- o $30,000 -- $49,000 per year
- o $50,000 or more per year

What is your marital status?
- o Single
- o Married
- o Separated/Divorced
- o Widowed

If you are not currently married, do you live with a partner (boyfriend, girlfriend)?
- o Yes
- o No

Which of the following best describes your religion?
- o Catholic
- o Protestant
- o Buddhist
- o Muslim
- o Jewish
- o Mormon
- o Jehovah Witness
- o Other (please specify) ________________
- o I do not consider myself to be religious.

What is your most recent college major? __________________

Selections highlighted; responses by initials.
VH: Virginia Noland
PT: Pam Taylor
EH: Elissa Howard

II. Predisposing variables: Knowledge of HPV:
Heading:
"Please answer some questions about your knowledge of Human papillomavirus. Choose the best response."

Participant's Responses: True, False, Not Sure	Item Relevance		
	Low	Med	High
8. Human papillomavirus (HPV) is transmitted by poor hygiene.	2	1	
9. HPV is transmitted by skin-to-skin contact.		1	2
10. HPV is transmitted by vaginal intercourse.		1	2
11. HPV can cause cancer.			3
12. HPV has the several physical symptoms.	1	1	1
13. HPV can be treated by over-the-counter medications.			3
14. Multiple sexual partners increase one's risk for HPV infection.		1	2
15. The best way to prevent complications from HPV is a Pap test.			3
16. If a woman's pap smear is normal she doesn't have HPV.		1	2
17. Changes in a pap smear may indicate that a woman has HPV.		2	1
18. Genital warts are caused by the herpes virus.	1	2	
19. The best way to prevent complications from HPV is to have regular Pap tests.	1	1	1
20. Pap smears will almost always detect HPV.		1	2
21. HPV can be passed from the mother to baby during birth.	1	2	
22. HPV is the virus that can cause cervical cancer.			3
23. Genital warts are caused by HPV.			3
24. HPV is the virus that causes herpes.	1	2	

25. Men can be infected with HPV.		1	2
26. A condom can decrease the risk for HPV infection.		1	2

- Circle the numbers of the best five items in this section. Indicated by highlight.
  - Suggestions of new items and/or how to improve this section:

PT: What percent of the general population has HPV?
EH: A woman will have visible signs or symptoms when she has HPV.

III. Knowledge of cervical cancer:
Heading:
"Please answer some questions about your knowledge of cervical cancer. Choose the best response."

Participant's Responses: True, False, Not Sure	Item Relevance		
	Low	Med	High
1. Cervical cancer can be treated.		1	2
2. Cervical cancer can reoccur.			3
3. Cervical cancer can be fatal.		1	2
4. If detected early, cervical cancer has greater success in treatment.		1	2
5. Cervical cancer can be inherited from family members.	2	1	
6. Cervical cancer is caused by a virus.		2	1
7. Sexual activity at an early age can increase the risk for cervical cancer.		2	1
8. Lack of cleanliness/hygiene can increase the risk for cervical cancer.	1	2	
9. Having a mother who has had cervical cancer can increase the risk for cervical cancer.	1	1	1
10. Having many sexual partners can increase the risk for cervical cancer.			3

- Circle the numbers of the best five items in this section. Blue Highlight.
- Suggestions of new items and/or how to improve this section:

No suggestions.

IV. Knowledge of cervical cancer screening:

Heading:

"Please answer some questions about your knowledge of the Pap test. Choose the best response."

Participant's Responses: True, False, Not Sure	Item Relevance		
	Low	Med	High
1. A Pap test should be conducted annually (every year).		1	2
2. A good indication to begin obtaining a Pap test is one's age.		1	2
3. A good indication to begin obtaining a Pap test is the initiation of sexual activity.			3
4. To prepare for a Pap test, one should abstain from sexual activity for 48 hours.		2	1
5. A Pap test is used to check for abnormalities on the cervix.			3
6. If a woman's Pap test is normal, she doesn't have HPV.	1	1	1
7. Changes in a Pap test may indicate that a woman has HPV.		1	2
8. A Pap test will almost always detect HPV.		1	2
9. Women over 65 no longer need to have a Pap test.	1	2	
10. To prepare for a Pap test, one should douche the day before the exam.	1	2	

- Circle the numbers of the best five items in this section.
- Suggestions of new items and/or how to improve this section:

No suggestions

V. Attitudes about HPV:

Heading:

"If you tested positive for HPV, how would you feel? Choose the best response."

Scale: Not at all, a little, moderately, quite a bit, extremely	Item Relevance		
	Low	Med	High
1. Scared			3
2. Angry			3
3. Vengeful	1	1	1
4. Guilty		1	2
5. Relaxed	2	1	
6. Hopeful	1	1	1
7. Anxious		3	
8. Desperate		1	2
9. Confused			3

10. Dirty	1		2
11. Regretful		1	2
12. Violated	1	1	1
13. Panicked		1	2
14. Worthless	1	1	1
15. Deceived	1	1	1
16. Indifferent	1	2	
17. Calm	2	1	

- Circle the numbers of the best five items in this section.
- Suggestions of new items and/or how to improve this section:

No suggestions

VI. Attitudes about Cervical Cancer:
Heading:
"If you were diagnosed with cervical cancer, how would you feel? Choose the best response."

	Item Relevance		
Scale: Not at all, a little, moderately, quite a bit, extremely	Low	Med	High
1. Scared			3
2. Angry			3
3. Vengeful	1	1	1
4. Guilty		1	2
5. Relaxed	2		
6. Hopeful	1	1	1
7. Anxious		2	1
8. Desperate	1	1	1
9. Confused		1	2
10. Dirty	1		2
11. Regretful	1		2
12. Violated	1	1	1
13. Panicked		2	1

14. Worthless	1	1	1
15. Deceived	1	1	1
16. Indifferent	1	2	
17. Calm	2	1	

- Circle the numbers of the best five items in this section.
- Suggestions of new items and/or how to improve this section:

No suggestions

VII. Attitudes about Cervical Cancer Screening:
Heading:
"How would you feel about having a Pap test? Choose the best response."

Scale: Not at all, a little, moderately, quite a bit, extremely	Item Relevance		
	Low	Med	High
1. Scared			3
2. Angry	1	1	1
3. Vengeful	2		1
4. Guilty		3	
5. Relaxed	1		2
6. Hopeful	1	1	1
7. Anxious		1	2
8. Desperate	1	1	1
9. Confused		2	1
10. Dirty	1	1	1
11. Regretful	2		1
12. Violated		2	1
13. Panicked	1		2
14. Worthless	1	1	1
15. Deceived	1	2	
16. Indifferent	1	2	

17. Calm	2		1

- Circle the numbers of the best five items in this section.
- Suggestions of new items and/or how to improve this section:

No suggestions

VIII. Beliefs about HPV

Heading:

Indicate how much you Agree or Disagree with each of the following statements about Human papillomavirus. Please choose the best response."

(Likert Scale, 1 – 5: Strongly Disagree, Strongly Agree)	Item Relevance		
	Low	Med	High
1. Any woman can get HPV.		2	1
2. I am more likely to get HPV than women of other ethnic groups.		2	1
3. I am more likely to get HPV than older women.	1	1	1
4. There is not much I can do to prevent HPV.			3
5. I would be afraid to tell my partner if I had HPV.		1	2
6. A woman can have HPV but have no symptoms.			3
7. I think I would rather not know if I had HPV.	1	1	1
8. HPV is treatable.			3
9. A woman can reduce her risk for HPV.		1	2
10. A woman is at greater risk for HPV if she does not have a regular partner.		2	1
11. HPV is life-threatening.	1	1	1

- Circle the numbers of the best five items in this section.
- Suggestions of new items and/or how to improve this section:

No suggestions

IX. Beliefs about Cervical Cancer:

Heading:

Indicate how much you Agree or Disagree with each of the following statements about cervical cancer. Please choose the best response."

(Likert Scale, 1 – 5: Strongly Disagree, Strongly Agree)	Item Relevance		
	Low	Med	High
1. Any woman can get cervical cancer.			

2. Cervical cancer is fatal.			
3. A woman can have cervical cancer but have no symptoms.			
4. I would be afraid to tell my partner if I had cervical cancer.			
5. If found early, cervical cancer can be cured.			
6. I think I would rather not know if I had cervical cancer.			
7. At my age, I don't need to worry about cervical cancer.			
8. I am more likely to get cervical cancer than women of other ethnic groups.			
9. There is not much I can do to prevent cervical cancer.			

- Circle the numbers of the best five items in this section.
- Suggestions of new items and/or how to improve this section:

No suggestions

X. Beliefs about Cervical Cancer Screening:
Heading:
Indicate how much you Agree or Disagree with each of the following statements about the Pap test. Please choose the best response."

(Likert Scale, 1 – 5: Strongly Disagree, Strongly Agree)	Item Relevance		
	Low	Med	High
1. Women should only have a Pap test if sexually active.		1	2
2. Women should only have Pap tests if they have symptoms.	1	1	1
3. Pap test results are often incorrect.		2	1
4. A Pap test might save a woman's life.		1	2
5. Pap tests are not necessary for older women.		1	2
6. Pap tests are painful.	1		2
7. Pap tests are uncomfortable.		2	1
8. Pap tests are embarrassing.		2	1
9. Pap tests are necessary.			3

- Circle the numbers of the best five items in this section.
- Suggestions of new items and/or how to improve this section:

No suggestions

XI. Female Provider

Heading:

"Please answer the following questions by choosing the best response."

(Participant response: Yes, No, Not sure)	Low	Med	High
I prefer a female provider for reproductive/gynecological health services.		1	1
I have a female provider for reproductive/gynecological health services.		1	1

- Suggestions of new items and/or how to improve this section:

VN: Define provider

Insurance

Heading:

""Please answer the following questions by choosing the best response."

(Participant response: Yes, No, Not sure)	Low	Med	High
I have health insurance.			1
I have health insurance that covers a Pap test.			1

- Suggestions of new items and/or how to improve this section:

PT: If I keep my Pap test up depends on my financial resources.

VN: What about Medicaid?

"I have insurance that covers Pap tests."

XII. Reinforcing variables:

Contraceptive Use

Heading:

"Please answer the following questions by choosing the best response."

(Participant response: Yes, No, Not sure)	Item Relevance		
	Low	Med	High
I use a prescription contraceptive (such as oral contraceptives, Depo-Provera, Lunelle, OrthoEvra, NuvaRing, IUD).		1	1
My prescription contraception requires annual gynecological visits.		1	1

- Suggestions of new items and/or how to improve this section:

VN: contraceptive/birth control

"…requires an annul visit with my healthcare provider"

PT: I only keep my Pap appt. to ensure I will receive my contraception.

Comfort:

Heading:

"Please answer the following questions by choosing the best response."

(Participant response: Yes, No, Not Sure)	Item Relevance		
	Low	Med	High
I am physically comfortable during a Pap test.		1	1
I am emotionally comfortable during a Pap test.			2

- Suggestions of new items and/or how to improve this section:

VN: It is important for me to be physically comfortable during a Pap test.

It is important for me to be emotionally comfortable during a Pap test.

Previous abnormal Pap test results:
Heading:
"Please answer the following questions by choosing the best response."

(Participant response: Yes, No, Not Sure)	Item Relevance		
	Low	Med	High
I have never had a Pap test.			2
I have had at least one irregular/abnormal Pap test result.	1		1
I have never had an irregular/abnormal Pap test result.		1	1

- Suggestions of new items and/or how to improve this section:

VN: All of my Pap tests have been normal.

Outcome variable:
XIII. Cervical cancer screening behavior

Heading:
"Have you had a Pap test within the past year? Please choose the best response."
- o Yes
- o No
- o Not Sure

What are your sources of information regarding the Pap test? (check all that apply)
- o Mother
- o Other female relative
- o Physician or other medical care provider
- o Friend
- o Class
- o Brochure/Pamphlet
- o Other (specify):_________

VN: magazine, television

APPENDIX G
PILOT TEST I PARTICIPANT WORKSHEET

Suggestion Worksheet

Instructions: In the table below, 1) clearly identify each problem that you encountered while taking the questionnaire, 2) explain why you think this is a problem and 3) offer specific suggestions to correct the problem. In the second section, offer your top three suggestions for improving this questionnaire and give any general comments.

Item # and Page #	What's the problem?	Why is this a problem?	How can this problem be solved?

Section 2:

What should I do to improve this questionnaire?

1.

2.

3.

General comments:

APPENDIX H
PILOT TEST I PARTICIPANT COMMENTS

Suggestions for improvement:

"Maybe have a brief description of HPV, but that might deceive the point of the research."

"Spell out HPV in case some aren't aware of what the abbreviation stands for."

"Maybe define each topic questioned."

"Give more of an understanding as to HPV."

General comments:

"I think the questionnaire is fine."

"Good survey overall."

"The questions were well-stated and understandable! No problems taking questionnaire!"

"Good survey."

"Interesting!"

"The questionnaire was good overall but it needs more info. I would probably put a paragraph explaining a little about the disease and tests."

"The questionnaire is great—no changes need to be made."

"It assumes that the taker is sexually active."

APPENDIX I
PILOT TEST II PARTICIPANT SOLICITATION

Research Participation
University of Florida
Women's Reproductive Health Questionnaire

I am a doctoral candidate completing the required dissertation research. I am looking for women over 18 to provide responses to a questionnaire that I developed, as well as feedback about the design and user-friendliness of the study. This questionnaire will be sent to your UF Gatorlink account with an internet link to the questionnaire website.

The questionnaire concerns reproductive health information and care among college women. The purpose of this study is to identify the predisposing, reinforcing and enabling factors associated with college women's compliance with cervical cancer screening behaviors. The information you provide will help identify the kind of cervical cancer screening programs and services college women at the University of Florida need.

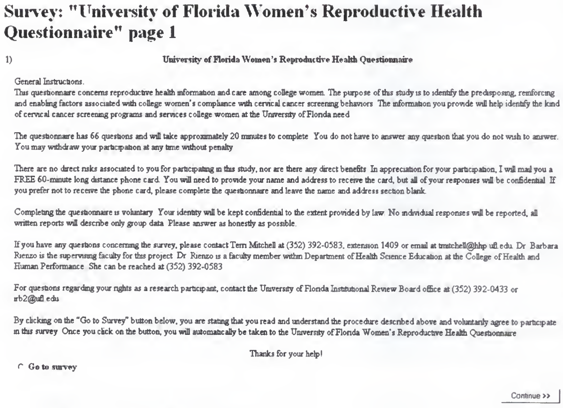
In appreciation for your participation, you will receive a FREE 60-minute long distance phone card.

To participate, please provide the following information:

- ✓ Name: ______________________
- ✓ Email address: _______________________
- ✓ HSC 2100 Period: ___________
- ✓ Age: _______

You may return this to Terri or your HSC 2100 instructor.

APPENDIX J
FINAL QUESTIONNAIRE



Survey: "University of Florida Women's Reproductive Health Questionnaire" page 1

1) **University of Florida Women's Reproductive Health Questionnaire**

General Instructions.
This questionnaire concerns reproductive health information and care among college women. The purpose of this study is to identify the predisposing, reinforcing and enabling factors associated with college women's compliance with cervical cancer screening behaviors. The information you provide will help identify the kind of cervical cancer screening programs and services college women at the University of Florida need.

The questionnaire has 66 questions and will take approximately 20 minutes to complete. You do not have to answer any question that you do not wish to answer. You may withdraw your participation at any time without penalty.

There are no direct risks associated to you for participating in this study, nor are there any direct benefits. In appreciation for your participation, I will mail you a FREE 60-minute long distance phone card. You will need to provide your name and address to receive the card, but all of your responses will be confidential. If you prefer not to receive the phone card, please complete the questionnaire and leave the name and address section blank.

Completing the questionnaire is voluntary. Your identity will be kept confidential to the extent provided by law. No individual responses will be reported, all written reports will describe only group data. Please answer as honestly as possible.

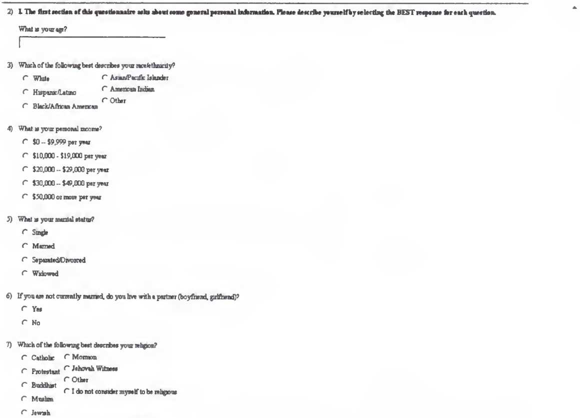
If you have any questions concerning the survey, please contact Terri Mitchell at (352) 392-0583, extension 1409 or email at tmitchell@hhp.ufl.edu. Dr. Barbara Rienzo is the supervising faculty for this project. Dr. Rienzo is a faculty member within Department of Health Science Education at the College of Health and Human Performance. She can be reached at (352) 392-0583.

For questions regarding your rights as a research participant, contact the University of Florida Institutional Review Board office at (352) 392-0433 or irb2@ufl.edu.

By clicking on the "Go to Survey" button below, you are stating that you read and understand the procedure described above and voluntarily agree to participate in this survey. Once you click on the button, you will automatically be taken to the University of Florida Women's Reproductive Health Questionnaire.

Thanks for your help!

○ **Go to survey**



2) **I. The first section of this questionnaire asks about some general personal information. Please describe yourself by selecting the BEST response for each question.**

What is your age?

3) Which of the following best describes your race/ethnicity?

○ White
○ Hispanic/Latino
○ Black/African American
○ Asian/Pacific Islander
○ American Indian
○ Other

4) What is your personal income?

○ $0 -- $9,999 per year
○ $10,000 - $19,000 per year
○ $20,000 -- $29,000 per year
○ $30,000 -- $49,000 per year
○ $50,000 or more per year

5) What is your marital status?

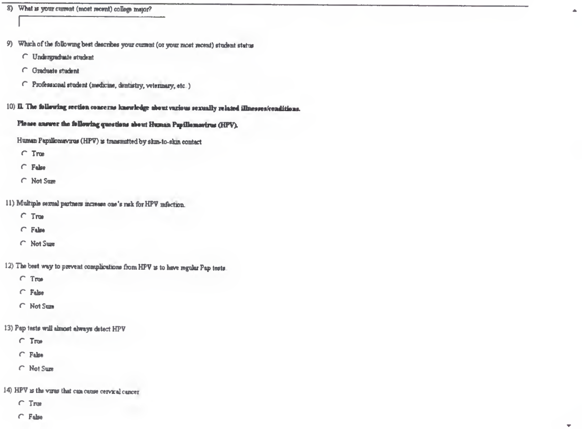
○ Single
○ Married
○ Separated/Divorced
○ Widowed

6) If you are not currently married, do you live with a partner (boyfriend, girlfriend)?

○ Yes
○ No

7) Which of the following best describes your religion?

○ Catholic
○ Protestant
○ Buddhist
○ Muslim
○ Jewish
○ Mormon
○ Jehovah Witness
○ Other
○ I do not consider myself to be religious



8) What is your current (most recent) college major?

9) Which of the following best describes your current (or your most recent) student status

○ Undergraduate student
○ Graduate student
○ Professional student (medicine, dentistry, veterinary, etc.)

10) **II. The following section concerns knowledge about various sexually related illnesses/conditions.**

Please answer the following questions about Human Papillomavirus (HPV).

Human Papillomavirus (HPV) is transmitted by skin-to-skin contact

○ True
○ False
○ Not Sure

11) Multiple sexual partners increase one's risk for HPV infection.

○ True
○ False
○ Not Sure

12) The best way to prevent complications from HPV is to have regular Pap tests.

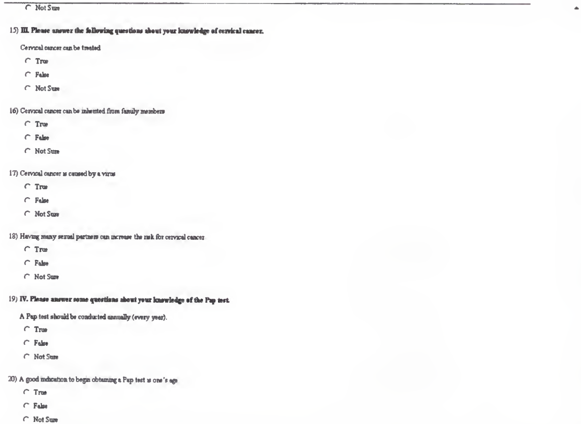
○ True
○ False
○ Not Sure

13) Pap tests will almost always detect HPV

○ True
○ False
○ Not Sure

14) HPV is the virus that can cause cervical cancer

○ True
○ False



○ Not Sure

15) **III. Please answer the following questions about your knowledge of cervical cancer.**

Cervical cancer can be treated

○ True

○ False

○ Not Sure

16) Cervical cancer can be inherited from family members

○ True

○ False

○ Not Sure

17) Cervical cancer is caused by a virus

○ True

○ False

○ Not Sure

18) Having many sexual partners can increase the risk for cervical cancer

○ True

○ False

○ Not Sure

19) **IV. Please answer some questions about your knowledge of the Pap test.**

A Pap test should be conducted annually (every year).

○ True

○ False

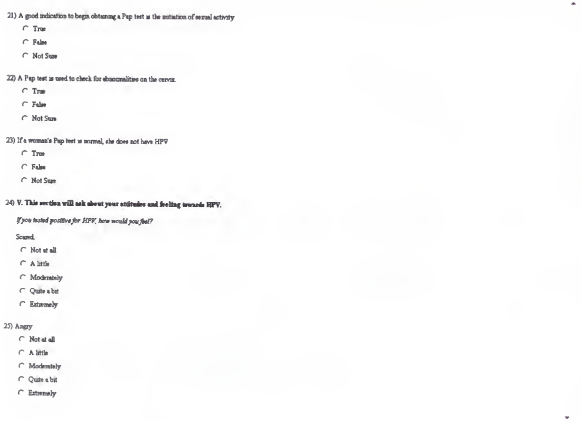
○ Not Sure

20) A good indication to begin obtaining a Pap test is one's age

○ True

○ False

○ Not Sure



21) A good indication to begin obtaining a Pap test is the initiation of sexual activity

○ True

○ False

○ Not Sure

22) A Pap test is used to check for abnormalities on the cervix.

○ True

○ False

○ Not Sure

23) If a woman's Pap test is normal, she does not have HPV

○ True

○ False

○ Not Sure

24) **V. This section will ask about your attitudes and feeling towards HPV.**

If you tested positive for HPV, how would you feel?

Scared.

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

25) Angry

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

26) Vengeful

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

27) Anxious

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

28) Guilty

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

29) Dirty

○ Not at all

○ A little

○ Moderately

○ Quite a bit

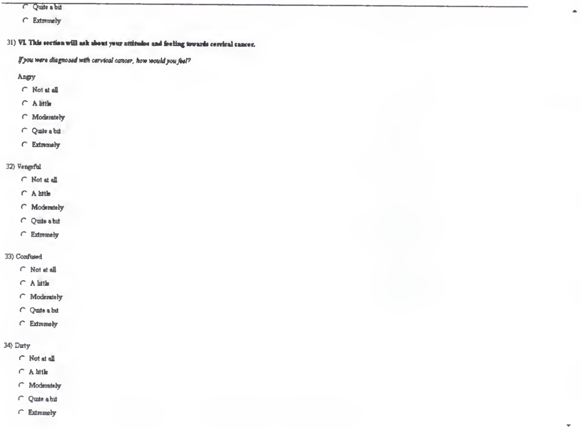
○ Extremely

30) Deceived

○ Not at all

○ A little

○ Moderately



○ Quite a bit

○ Extremely

31) **VI. This section will ask about your attitudes and feeling towards cervical cancer.**

If you were diagnosed with cervical cancer, how would you feel?

Angry

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

32) Vengeful

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

33) Confused

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

34) Dirty

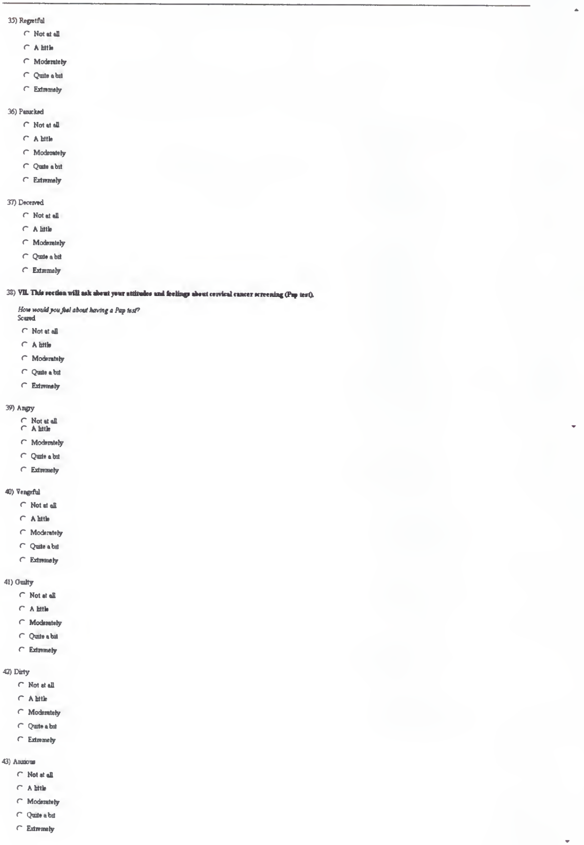
○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely



35) Regretful

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

36) Panicked

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

37) Deceived

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

38) **VII. This section will ask about your attitudes and feelings about cervical cancer screening (Pap test).**

How would you feel about having a Pap test?
Scared

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

39) Angry

○ Not at all
○ A little

○ Moderately

○ Quite a bit

○ Extremely

40) Vengeful

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

41) Guilty

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

42) Dirty

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

43) Anxious

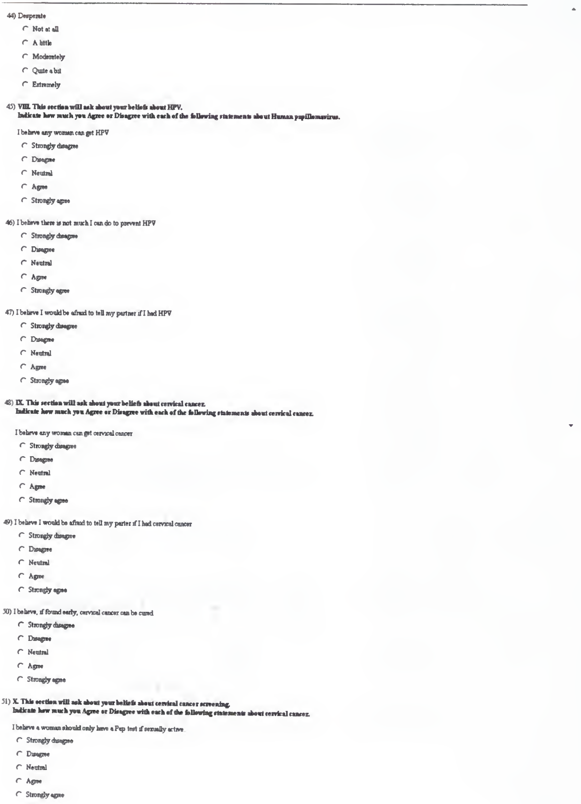
○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely



44) Desperate

○ Not at all

○ A little

○ Moderately

○ Quite a bit

○ Extremely

45) **VIII. This section will ask about your beliefs about HPV.**
Indicate how much you Agree or Disagree with each of the following statements about Human papillomavirus.

I believe any woman can get HPV

○ Strongly disagree

○ Disagree

○ Neutral

○ Agree

○ Strongly agree

46) I believe there is not much I can do to prevent HPV

○ Strongly disagree

○ Disagree

○ Neutral

○ Agree

○ Strongly agree

47) I believe I would be afraid to tell my partner if I had HPV

○ Strongly disagree

○ Disagree

○ Neutral

○ Agree

○ Strongly agree

48) **IX. This section will ask about your beliefs about cervical cancer.**
Indicate how much you Agree or Disagree with each of the following statements about cervical cancer.

I believe any woman can get cervical cancer

○ Strongly disagree

○ Disagree

○ Neutral

○ Agree

○ Strongly agree

49) I believe I would be afraid to tell my parter if I had cervical cancer

○ Strongly disagree

○ Disagree

○ Neutral

○ Agree

○ Strongly agree

50) I believe, if found early, cervical cancer can be cured

○ Strongly disagree

○ Disagree

○ Neutral

○ Agree

○ Strongly agree

51) **X. This section will ask about your beliefs about cervical cancer screening.**
Indicate how much you Agree or Disagree with each of the following statements about cervical cancer.

I believe a woman should only have a Pap test if sexually active

○ Strongly disagree

○ Disagree

○ Neutral

○ Agree

○ Strongly agree

---

52) I believe a woman should only have Pap tests if she has symptoms

○ Strongly disagree

○ Disagree

○ Neutral

○ Agree

○ Strongly agree

53) I believe that Pap tests are often incorrect

○ Strongly disagree

○ Disagree

○ Neutral

○ Agree

○ Strongly agree

54) **XI. This section will ask about your care preferences and insurance status.**
For this study, a provider is one who performs a Pap test and pelvic exam (physician, nurse practitioner, physician's assistant, etc)

I prefer a female provider for reproductive/gynecological health services

○ Yes

○ No

55) I have a female provider for reproductive/gynecological health services

○ Yes

○ No

56) *For this study, health insurance may include private insurance, school insurance, Medicaid, etc*

I have medical/health insurance

○ Yes

○ No

57) I have medical/health insurance that covers a Pap test

○ Yes

○ No

---

58) **XII. This section will ask about your contraceptive use, Pap test experience and comfort level with a Pap test.**

I use a prescription contraceptive/birth control (such as oral contraceptives, Depo-Provera, Lunelle, OrthoEvra, NuvaRing, IUD).

○ Yes

○ No

59) My prescription contraception/birth control requires annual visit with my healthcare provider

○ Yes

○ No

60) I have had a Pap test

○ Yes

○ No

61) All of my Pap tests have been normal.

○ Yes

○ No

62) I have had at least one irregular/abnormal Pap test result

○ Yes

○ No

63) It is important for me to be physically comfortable during a Pap test

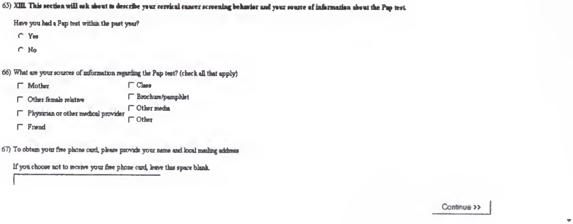
○ Yes

○ No

64) It is important for me to be emotionally comfortable during a Pap test

○ Yes

○ No



65) XIII. This section will ask about to describe your cervical cancer screening behavior and your source of information about the Pap test.

Have you had a Pap test within the past year?

○ Yes

○ No

66) What are your sources of information regarding the Pap test? (check all that apply)

☐ Mother
☐ Other female relative
☐ Physician or other medical provider
☐ Friend
☐ Class
☐ Brochure/pamphlet
☐ Other media
☐ Other

67) To obtain your free phone card, please provide your name and local mailing address

If you choose not to receive your free phone card, leave this space blank.

APPENDIX K
INSTRUMENT CODE BOOK

Code Book
University of Florida Women's Reproductive Health Questionnaire

Q2 Age:
Text field

Q3 Race/ethnicity:
White: 1
Hispanic: 2
Black: 3
Asian/Pacific Islander: 4
American Indian: 5
Other: 6

Q4 Personal income:
$0 -- $9,999 per year: 1
$10,000 - $19,000 per year: 2
$20,000 -- $29,000 per year: 3
$30,000 -- $49,000 per year: 4
$50,000 or more per year: 5

Q5 Marital status:
Single: 1
Married: 2
Separated/Divorced: 3
Widowed: 4

Q6 live with a partner:
Yes: 1
No: 0

Q7 Religion
Catholic: 1
Protestant: 2
Buddhist: 3
Muslim: 4
Jewish: 5
Mormon: 6

Jehovah Witness: 7
Other: 8
I do not consider myself to be religious: 9

Q8 Most recent college major:
Text field

Q9 Student status:
Undergraduate student: 1
Graduate student: 2
Professional student: 3

Q10-14 Knowledge of HPV:
True: 1
False: 0
Not Sure (scored as an incorrect response): 0

Q15, 17, 18 Knowledge of cervical cancer:
True:
False:
Not Sure (scored as an incorrect response):
Q16:
True: 0
False: 1
Not Sure (scored as an incorrect response): 0

Q19-22 Knowledge of Pap test:
True: 1
False: 0
Not Sure (scored as an incorrect response): 0
Q23:
True: 0
False: 1
Not Sure (scored as an incorrect response): 1

Q24-30 Attitudes and Feelings toward HPV:
Not at all: 1
A little: 2
Moderately: 3
Quite a bit: 4
Extremely: 5

Q31-37 Attitudes and Feelings toward cervical cancer:
Not at all: 1
A little: 2
Moderately: 3

- Quite a bit: 4
- Extremely: 5

Q38-44 Attitudes and Feelings toward Pap test:
- Not at all: 1
- A little: 2
- Moderately: 3
- Quite a bit: 4
- Extremely: 5

Q45 Beliefs about HPV:
- Strongly disagree: 1
- Disagree: 2
- Neutral: 3
- Agree: 4
- Strongly agree: 5

Q46-47:
- Strongly disagree: 5
- Disagree: 4
- Neutral: 3
- Agree: 2
- Strongly agree: 1

Q48, 50 Beliefs about cervical cancer:
- Strongly disagree: 1
- Disagree: 2
- Neutral: 3
- Agree: 4
- Strongly agree: 5

Q49:
- Strongly disagree: 5
- Disagree: 4
- Neutral: 3
- Agree: 2
- Strongly agree: 1

Q51-53 Beliefs about Pap test:
- Strongly disagree: 5
- Disagree: 4
- Neutral: 3
- Agree: 2
- Strongly agree: 1

Q54-57 Care and Insurance:
- Yes: 1
- No: 0

Q58-64 Contraception, Pap test and Comfort:
Yes: 1
No: 0

Q65 Outcome:
Yes: 1
No: 0

Q66 Sources of information:
Mother: 1
Other female relative: 2
Physician: 3
Friend: 4
Class: 5
Brochure: 6
Other media: 7
Other: 8

APPENDIX L
PRENOTIFICATION EMAIL

Dear UF student:

My name is Terri Mitchell and I am a doctoral candidate in the Department of Health Science Education at the UF. You have been selected at random as a potential participant in a research study on UF women's health. If you choose to participate, you will be helping to identify some important issues related to reproductive health care. Education and services for women at UF (and other universities) will be enhanced as a consequence of this research project.

Within the next couple of days, you will receive another email with a link to this important survey. I would greatly appreciate it if you could take a few minutes to complete it. By doing so, you will help ensure that I have the best information possible. In appreciation of your participation, I will send you a 60-minute long distance phone card.

If you have any questions, please feel free to contact me at 352-392-0583, extension 1409 or by email at mitchelt@ufl.edu.

Thank you in advance for your cooperation.

Sincerely,

Terri Mitchell
PhD Candidate, Health Science Education
University of Florida

APPENDIX M
INITIAL CONTACT WITH QUESTIONNAIRE LINK

Dear UF student:

My name is Terri Mitchell and I am a doctoral student in the Department of Health Science Education at the University of Florida. This is my second contact with you and I have included the link to the questionnaire web page.

My research includes the collection of information from female college students. I hope to find some of the reasons women have their Pap test done and, consequentially, develop education and services for a University environment to encourage more women to have a Pap test.

From a random sample, you have been identified as a female registered at the University of Florida during the Fall 2002. Below is a link to the questionnaire. I would greatly appreciate it if you could take a few minutes to complete it. By doing so, you will help ensure that I have the best information possible. For your participation, I will send you a 60-minute long distance phone card. Please fill out the questionnaire and submit to me by Wednesday, June 4, 2003.

Be assured that your answers are completely confidential. All written reports will describe only group data. I have requested your name and address so that I may send you a 60-minute phone card as a token of appreciation for your participation. Your name will not be included with your information, and there are no risks for participating.

Your participation is completely voluntary, and you do not have to answer any question you do not wish to answer. You DO NOT have to provide your name and address if you do not want the phone card. You will help this effort very much by taking the approximately 20 minutes it takes to complete this questionnaire.

If you have any questions, please feel free to contact me at 352-392-0583, extension 1409 or by email at mitchelt@ufl.edu. Thank you in advance for your cooperation. Please click on the link below to be taken to the survey site.

Sincerely,

Terri Mitchell, PhD Candidate

Questionnaire Link: http://survey.hhp.ufl.edu/index.php?id=55

APPENDIX N
SECOND CONTACT WITH QUESTIONNAIRE LINK

Dear UF student (or former student):

My name is Terri Mitchell and I am a doctoral student in the Department of Health Science Education at the University of Florida. This is my third contact with you regarding a survey I am conducting on women's reproductive health.

If you have responded to the questionnaire already, thanks very much! For those of you who provided either a name OR address (but not both), please send me an email with the complete information so I can send your phone card. If your uncertain, please do not go back to the link, send an email and I'll take care of it.

For those of you who have not had a chance to respond, I know your time is valuable; however, I would be very appreciative if you would take a few moments to go to the questionnaire link and respond to the survey. You will provide a voice for all women at the University of Florida. Your participation is completely confidential.

If you have any questions, please feel free to contact me at 352-392-0583, extension 1409 or by email at tmitchell@hhp.ufl.edu.

Thanks again for your cooperation. Please click on the link below to be taken to the survey site.

Sincerely,

Terri Mitchell

Questionnaire link: http://survey.hhp.ufl.edu/index.php?id=55

APPENDIX O
THIRD CONTACT WITH QUESTIONNAIRE LINK

Apologies to those who have responded--due to the anonymity of the questionnaire, this is a difficult problem to resolve!

To UF Women (former students):

About ten days ago, I sent you a link to a questionnaire about your knowledge and beliefs around reproductive health for women.

I have received responses from a variety of women, and many have shared their experiences, both good and bad. I think the information will very useful for women's healthcare professionals.

I am writing again because of the importance that your questionnaire response has for helping to get accurate results. Although I sent emails to a large sample of women throughout the University of Florida, it is only by hearing from you that I can be sure that the results are truly representative.

A comment on the survey procedures: unless you provide your name and address for the phone card, I have no way of identifying you. You are not connected to your responses in any way, regardless. Protecting the confidentiality of people's answers is very important to me, as well the University.

I hope that you will take a few moments to respond to the questionnaire. You will provide a voice to the 24,000+ women enrolled here at UF, an invaluable service.

Sincerely,

Terri Mitchell

Questionnaire link: http://survey.hhp.ufl.edu/index.php?id=55

APPENDIX P
PARTICIPANT THANK YOU

December 15, 2003

Dear UF College Woman:

Thanks so much for your participation in the Women's Reproductive Health Questionnaire. I am in the midst of writing up of the findings and your assistance has been invaluable.

As promised, please find an enclosed 60-minute phone card. Best of luck to you on all of your endeavors. Please contact me with any additional questions or concerns at tmitchell@hhp.ufl.edu.

Sincerely,

Terri Mitchell
Principal Investigator
PhD Candidate

BIOGRAPHICAL SKETCH

Terri Mitchell began her undergraduate degree at West Virginia University in the fall of 11986. She received a Bachelor of Science in Journalism in December 1991. In the spring of 1992, she entered the graduate program at West Virginia University. She received a Master of Science in community health education in December 1993. She will be granted a Doctor of Philosophy in health and human performance with an emphasis in health behavior and a minor in women's studies and gender research through the College of Health and Human Performance, Department of Health Education and Behavior, in August of 2004. Terri will start as an assistant professor at East Carolina University in the College of Health and Human Performance, Department of Health Education & Promotion in August of 2004.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Barbara A. Rienzo

Barbara A. Rienzo, Chair
Professor of Health and Human
Performance

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Jill Varnes

Jill W. Varnes
Professor of Health Education and
Behavior

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

R. Morgan Pigg, Jr.

R. Morgan Pigg
Professor of Health Education and
Behavior

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Jiunn-Jye Sheu
Assistant Professor of Health Education
and Behavior

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Anne E Seraphine

Anne E. Seraphine
Assistant Professor of Educational
Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Angel Kwolek-Folland
Professor of History

This dissertation was submitted to the Graduate Faculty of the College of Health and Human Performance and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August 2004

Dean, College of Health and Human
Performance

Dean, Graduate School